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## BRIEFLY TOLD.

COL. FRED. S. BENSON RETIRES FROM ACTIVE SERVICE.—We do not know whether to be pleased or sorrowful over the official announcements that Colonel Frederick S. Benson has resigned his position as Chief Engineer of the Brooklyn Union Gas Company, Eastern Division, that his resignation has been accepted by the Company's Directors, and that the resignation became effective the 1st inst. We state only the simple truth in saying that the resignation was accepted with deep regretfulness, and that could his superiors have prevailed upon him to remain actively with the Company such prevailing would have been. We are sorrowful over his retiring, possibly through the selfish motive that we would have him still within reach, ready to respond to the call for counsel, still knowing that he was active in the ranks. Pleasure, though, lies in his putting away the cares and burdens of responsibility in active directing at a time when, with every faculty alert, and with the competence which assures to him ease of mind, his period of comparative inactivity will be that of one who reaps the peaceful fruition of times of labor well spent. Colonel Benson first became actively identified with the local gas industry when engaged by the capitalists of Brooklyn, N. Y., to assume the active engineering management of the Nassau Gas Light Company of that city, which works were completed in 1871. It was in its beginning perhaps the best equipped one from a modern standpoint in the United States, and its success as a profitable enterprise is largely due to his watchful supervision and to his capable direction. He continued as its master mind until the merger that resulted in the formation of the Brooklyn Union Gas Company, in 1895, of which corporation he was chosen the Engineer-in-Chief. In 1896, thegreat area covered by the Company in its works, and the imperative necessity that existed for the rearrangement and harmonizing of the many plants taken over by the syndicate, brought about a division of its territory, in 1896, in which year Colonel Benson was named to direct its Eastern Division, the Western Division being placed in charge of Mr. J. H. Jordan. This plan worked exceedingly well, and we venture the opinion that no other ranking officers in any great corporation ever worked in better harmony than the gentlemen named. Later on, perhaps, the Colonel will consent to our publication of an authentic narrative of his engineering career, for in that recital will be much of interest to his contemporaries. His lines indeed were laid in troublesome times and perilous places, but through it all his Company well held its own, and went on to success through methods of direction that will to this day bear the closest scrutiny. We, in common with the fraternity at large, wish for him in his retirement all the happiness that can possibly come to those who, having labored long and successfully, turn to the enjoyment of peaceful days worthily won.

FORMATION OF A CANADIAN GAS ASSOCIATION.—We are indebted to a special correspondent for the following interesting budget: A largely attended meeting of the representatives of Canadian gas companies was held in the King Edward Hotel, Toronto, Thursday, November 21st, for the purpose of forming a Canadian Gas Association. It has been felt for a long time that an Association of purely Canadian gas companies would be a great benefit to the industry in this country, and as a great number of companies are not interested in any existing Gas Association, it was decided to try to bring these different ones together so as to foster friendly intercourse and promote commercial interests of members engaged in the business in the Dominion of Canada. The Hon. William Gibson, President of the Hamilton Gas Company, was called to the chair, and, in a speech describing the object of the Association, impressed upon those present the necessity of having an Association with a membership representative of the whole gas industry in Canada. If the first meeting is any criterion of the success of the Association it will indeed be a grand one. As an initial meeting where so much preliminary work had to be dealt with and questions regarding organization thrashed out, it certainly gave great encouragement to the ones who had started the work. Letters were read from those unavoidably absent and their hearty co-operation in every instance was expressed. It was decided to have both active and associate members, the fee for both classes being $15 for the first year of membership and $10 for each succeeding year. On nominations being called for, the following officers were elected: President, Mr. H. H. Powell, Brantford; First Vice-President, Mr. J. S. Norris, Montreal; Second Vice-President, Mr. J. Keillor, Hamilton; Secretary and Treasurer, Mr. A. W. Moore; Executive Committee, Mr. Charles Forbes, J. C. Hay, W. C. Kennedy, W. H. Pearson, J. [illegible]


LIBRARY OF CONGRESS DEC 9 1907 SMITHSONIAN DEPOSIT

J. Philip. A very successful inaugural meeting was terminated in a hearty vote of thanks to the Chairman. I will advise you in ample time of the progress that is being made.—M.

DEATH OF MR. WILLIAM COX.—With much regret we report the death of Mr. William Cox, whose summons came the morning of Sunday, December 1st, at his home, No. 971 Summit avenue, in Bronx Borough, New York city. The funeral services were held in his late residence, the afternoon of Wednesday last. Deceased, who was in his 61st year, was at one time prominent in water works construction and was a man of much ability in the profession of civil engineering. He was also a noted mathematician and was the compiler and arranger of a water flow computer that gained him fame from its practicability; but he will be best known to the gas industry of this and other countries from the mathematical device known as "Cox's Gas Flow Computer," which helpful reckoning will be found in the bookcase of almost every gas engineer.

DEATH OF MRS. AMANDA C. CORBETT.—The heartfelt sympathy of his host of friends in the gas industry will go out in unstinted measure to Mr. Charles H. Corbett, Sr., over the great sorrow that has visited him in the death of his estimable wife, Amanda C. Corbett. Her death occurred Thursday, November 28th, and the funeral services were held the afternoon of November 30th, in St. James Church, Lafayette avenue and St. James place, Brooklyn, the Reverend Dr. Naumann officiating. Deceased was born in New York city, June 28, 1842, and was a daughter of the late Jeronemus S. Underhill, who was a well-known constructor of ironclad war ships or vessels during the Civil War. She became the wife of Mr. Charles H. Corbett (whose long connection with the Continental Iron Works, of the Greenpoint section of Brooklyn, has made him well-known to the gas fraternity) in 1865, and in 1867 they removed to Brooklyn where the remainder of her harmonious, useful life was spent. She was unobtrusively given to charitable work, and on the records of the Protestant Episcopal Church of St. James can readily be found many instances of its effectiveness. Besides her husband, she is survived by one daughter, three sons, and three brothers. Of her it may be truthfully said, her life was useful and productive of good; that her death was the announcement of her reward.

OUTDOOR ADVERTISING IN BRAZIL.—Dr. Edouardo Morpurgo, the Commissioner of Public Lighting for Rio Janeiro, Brazil, who as many gas men know is visiting this country for the purpose of inspecting our public lighting methods here, writing to us under date of the 29th ult., says: To the Editors AMERICAN GAS LIGHT JOURNAL: I read in your issue for this week a short article entitled "Outdoor Advertising in Brazil." I thoroughly appreciate the desire of your publication to be well informed regarding the matters of which it treats, so let me join in the matter with an explanation thereof. What you say respecting taxes is true, but such is not the only reason (possibly not the reason at all) that a larger number of electrically lighted signs cannot be seen in Rio Janeiro. The users of electrically operated motors in Brazil are very few, but those who have an electric motor equipment on their premises usually maintain electric signs on their buildings. For instance I might name as such users, the city in the Park, on the Largo Muchado Square, the newspaper office building of *Jornal do Brazil*, which is a very effective sign, and others - it is true, they are few. The reason for this paucity perhaps is mainly in the rates charged for the energizing supply, which is, by-the-way, furnished by an American Company, operating hydraulically. The charge (1 mil reis, equal to 33 cents in American money) is per kilowatt per hour, which charge is certainly not an argument to users to go more largely into the maintaining of electric signs for advertising purposes. In fact, I am sure you will admit the charge is rather a high one. Let us hope these signs will multiply when the charge for current is more moderate.

DECEMBER MEETING, ILLUMINATING ENGINEERING SOCIETY, NEW YORK SECTION.—Mr. Preston S. Millar, Secretary, New York Section Illuminating Engineering Society, informs us that the next meeting will be held in the United Engineering Societies Building, 33 West 39th street, at 8:15 P.M. of the 12th inst. The paper for the evening is to be presented by Mr. Bassett Jones, Jr., whose theme is "The Relation of Architectural Principles to Illuminating Engineering Practice." It is arranged for that, Mr. Jones' communication by a number of architects and illuminating engineers. It should be remembered that non-members as well as members are welcomed at these sessions.

[Continued from page 977.]

## PROCEEDINGS AMERICAN GAS INSTITUTE, SECOND ANNUAL MEETING, HELD AT THE NEW WILLARD HOTEL, WASHINGTON, D. C., OCTOBER 16, 17 AND 18, 1907.

SECOND DAY—MORNING SESSION.

The meeting was called to order by President Clark, on Thursday, October 17, at 10 A.M., who introduced Mr. Milan R. Bump, who presented the following

BUDGET FROM THE WRINKLE DEPARTMENT,

prefacing the reading of same with the following remarks:

Editor Bump—Mr. President and Gentlemen: I was rather unfortunate in getting a late start on the work of the Wrinkle Department this year, and also in being away from my office a good deal of the time. Some of the material I was unable to get in shape to put into this report, and, therefore, I merely put in what I had time to get in shape to hand to the printers. The consequence is, considerable material can be handed to the Editor of next year's Wrinkle Department, which I think will prove of value. I desire to present the material as contained in the "Proceedings," and also desire to thank the members of the Institute for the valued assistance which they have given me. Considering the late start, the results reflect credit on the co-operative spirit of our members.

[For the first Wrinkle Chapters, see JOURNAL, *ante*, Nov. 25 and Dec. 2.]

No. 48.—*Method of Clearing Gas Filled Vessels.*—"Whenever it becomes necessary to open chambers filled with gas where there might be danger of explosion, a very good method is to clean the chamber with steam and, after opening and cleaning or repairing, to again clear the chamber out thoroughly with steam and then turn in the gas. The steam condenses and leaves the chamber full of gas. Care should be taken to leave the steam on long enough to allow the chamber to become thoroughly heated to prevent too sudden condensation of the steam."

No. 49.—*Method of Clearing Gasholders Before Turning in Gas.*—"In order to prevent all danger to gasholder before putting it into service the following plan could be followed: Pass waste flue gas from the benches into the holder and dilute the atmosphere until the relative amount of oxygen is very small, and then turn in the gas. There is then no danger of forming an explosive mixture which, if ignited, might wreck the holder. In the case of large holders or holders remote from the works, a good plan is to build a temporary furnace for obtaining the necessary flue products or to connect a gas burner of large capacity and pass the flue products through the holder until the air is replaced by them."

No. 50.—*Means of Cheaply Increasing the Capacity of Existing Distributing Systems.*—"Once at Columbus, O., we had an unexpected and a severe lack of gas supply at the eastern extremity of the city. This shortage was not noticed until the frost had sunk deep into the ground. All of the available routes for a new gas main were paved. Our large main led out East Broad street under a beautiful asphalt street, which the city would not permit to be opened for a continuous ditch. I think this main was 16 inches in diameter. I proposed to Mr. Butterworth that we open this street at each block and insert a 4-inch steel main inside the 16-inch main, and by the use of suitable pressure regulators at suitable points, we would empty the gas from the 4-inch main into the 16-inch main, carrying whatever pressure on the 4-inch main which was necessary to yield sufficient conductivity to maintain our pressure, say, up to 60 pounds per square inch. This plan is open to the following objections:

"1. Reduction of capacity of the 16-inch pipe.

"2. Depreciation of the candle power, due to compression and high velocity of flow in 4-inch pipe.

"3. Power required.

"4. Low capacity of high pressure pipe if flow is no greater than a square foot of the pressure.

"The plan has the following advantages:

"1. Prevents tearing up streets for continuous ditch.

"2. Can be installed quickly and cheaply.

"3. Leakage from high pressure main will simply escape into low pressure main.

"4. Permits high conductivity with good pressure regulation."

No. 51.—*Scheme for Determining Leakage in Recuperator Flues of Gas Benches.*—"The low temperature of gases leaving the stack of a gas bench can only be explained by leakage of air from the secondary

flue to the waste gas flue. This leakage is a foe to good heats and economy. Suppose leakage does occur, the flow will be from point of greater pressure to point of lesser pressure, and as exhaust flues must have the lesser pressure, the secondary air will flow to the exhaust flues. This has a deterring effect in two ways: First, some of the heat absorbed in the secondary flues is lost because some of the secondary air is lost, and, second, this air dilutes and lessens the temperature in the exhaust flue, and the differential temperature between the secondary flue and the exhaust flue is thereby lessened and heat is transferred to the secondary air met further down. To lessen this leakage use stack damper to yield least possible difference between the secondary and exhaust flue. To determine extent and approximate location of this leakage, make flue gas analysis at point flue gases enter recuperator flues and test at each flue going down. The increase of O + O × 3.34 N = leakage, and the increase of O represents leakage at each flue. A heat balance can be worked out from this and the loss due to leaky flues approximated. Sometimes leaks in flues can be plastered up, resulting in better heats and less fuel consumption."

No. 52.—*Oil Piping System for Cold Climates.*—"In order to secure good oil circulation in cold weather, the following has proven satisfactory. Insert a ¼-inch pipe inside the oil pipe and when too cold for the oil to flow freely turn steam into the small pipe. Care must be taken to have the piping drain to the pump in this case in order to prevent any vaporization of the light oils from shutting off the pump. By means of this plan oil can easily be kept flowing in exposed piping in coldest weather."

No. 53.—*Screen for Protection of Blast Piping.*—"The method consists of the installation of a diagonal or conical screen of large area in the blast piping which will prevent ignition in the piping back of the screen. The screen is made diagonal or conical in order to give a large area and cause as little back pressure as possible. Fig. 1 shows diagonal screen in square box inserted in blast line, and Fig. 2 the conical screen in the blast pipe."

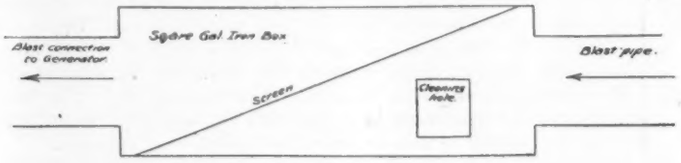



Fig. 1.

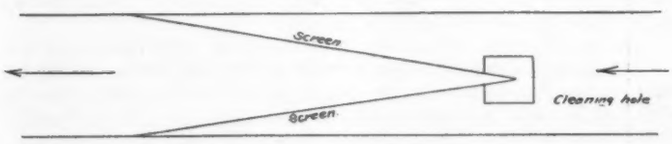
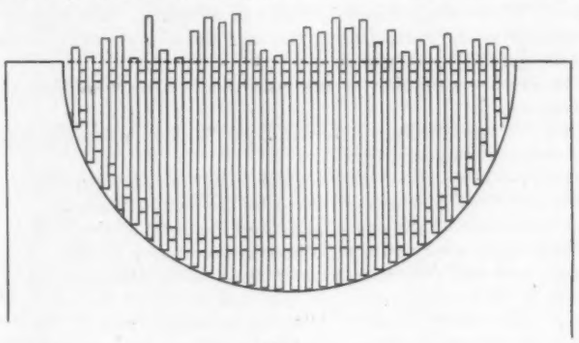



Fig. 2.

**Wrinkle No. 53.**

No. 54.—*Method of Making Round Scrubber Trays.*—"Make a semicircular form and make the trays in 2 or 4 sections, as desired. This method has the advantage of being simple and quick. The only sawing to be done is a straight cut instead of a circular cut as ordinarily made. It also enables assembling the trays with a very small waste of material, which is a considerable item where hard wood is used."



Form.

**Wrinkle No. 54.**

No. 55.—*Method of Using Canvas in Making Scrubber Trays.*—"The plan shown on the accompanying sketch shows a simple, cheap method of making scrubber trays. It is also effective for placing a large amount of surface in the scrubbers, being thinner than the box boards ordinarily used. The plan is to assemble the trays in section, taking care to keep the canvas tight when wet. Boards are inserted every 5th or 6th row to make the trays stiff and keep them in shape. The canvas can be wound around the cleats and each piece cut to fit the section between the wood braces."

**Wrinkle No. 55.**

No. 56.—*Deodorizing Foul Lime in Purifiers.*—"In order to overcome the offensive odor about the works when lime purifiers are being changed, I suggest that the boxes be connected to the waste flues from the benches or boilers and the lime carbonated before the box is opened. The outlet of these gases from the box should be into the chimney of the boiler plant, which will take them up into the air and dissipate them. When the lime is thoroughly carbonated it can be removed without trouble, and, if desired, it could be dried until caked enough to handle in lumps by admitting the flue gases hot."

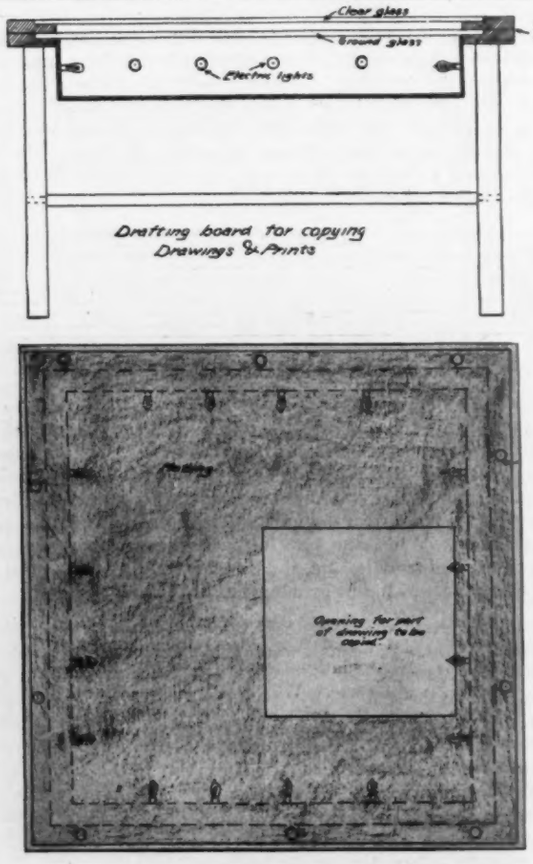
No. 57.—*Scheme for Heating Seal Box and Scrubber when Starting Water Gas Plant.*—"In small water gas plants where the machines are run only a few hours each day there is a considerable loss in cold weather, due to the seal box being cold and not getting into normal operating condition until quite a number of runs have been made, there being a considerable loss in candle power during these runs. In order to have the seal and scrubber in good condition before starting the runs, I suggest that a blow-off be installed on the outlet of the scrubber and that after the machines have been heated up to normal, the blast be passed through the seal and scrubber for a few minutes before starting the first run."

No. 58.—*Determination of Lowest Permissible Pressure on Hydraulic Main.*—"In order to secure best operating results the pressure in the hydraulic main should be no more than necessary to prevent drawing in of furnace gases. In order to arrive at the proper pressure the following method should be employed: Starting at the pressures now being carried on your hydraulic main, make a number of tests on the gas for $CO_2$ and O. Then reduce the pressure 1-tenth for several hours and repeat the tests. This should be continued until the tests begin to show some increase in $CO_2$ and O. Then if the hydraulic main is in sections, tests should be made to determine whether the seals are being drawn on any special section, and if possible the leak traced to a certain standpipe, which, if defective, should be repaired. After getting the house in as good uniform condition as possible, the seal should be increased ¼ to ½ inch above the point where leakage shows and maintained at that point, and the vacuum drawn by the exhausters should be readjusted whenever operating conditions are changed."

No. 59.—*Drafting Board for Copying Drawing Prints.*—"It is often desired to copy blue prints or other drawings or tabulations of various kinds, and a drafting table with a glass top serves as an excellent means of accomplishing this result. The board should be built with an ordinary pine frame with a large plate glass set in the frame and arranged for illumination underneath. In order to diffuse the light a ground glass screen or a piece of oiled paper or tracing cloth should be placed under the glass. The lights should be strong enough to allow seeing through two thicknesses of ordinary blue print paper clearly, and should be arranged to distribute the light as evenly as possible. For holding drawings on the board use a heavy paper mat fastened to the wooden frame. Cut a hole of the desired size, paste the drawing paper over same and then cut it off from the mat when finished."

No. 60.—*Distribution Record System.*—"In connection with the above plan, the following system of company records works out very nicely. Make the same scale separate record maps of the distribution mains as follows: (1) A map showing street only; (2) a skeleton map showing mains only; (3) a contour map showing elevations; (4) a map showing drips, etc. These maps can be placed over each other

Fig. 1




**Wrinkle No. 59.**

on the glass board above described in any desired combination, and can also be blue printed in any desired combination."

No. 61.—*Handy Street Main Reference.*—"A map of the street mains corrected weekly or monthly and placed under plate glass forming the top of the manager's desk and the application desk makes a very handy reference. A prospective customer can be told at a glance whether he can get service."

No. 62.—*Orsat Apparatus for Accurate Analysis.*—"The principal difficulty with the Orsat apparatus is to keep the solutions fresh and active as the solutions are still capable of considerable absorption after they are too old to remove the last traces of $CO_2$ and O. For this reason I suggest the use of two pipettes for each of those elements, one of which containing the older solution is first used to remove the bulk of the $CO_2$ or O, and the other containing a fresh solution is used for removing the last traces of these gases. In this way the new solution remains in good condition much longer. For accurate work the sample of gas should be passed back into the caustic potash solution after passing through the other solutions."

No. 63.—*Method of Increasing Capacity of Compressors.*—"In our Pintsch plant at Denver we were unable to handle our load with the compressors installed. In order to get additional capacity we installed a Roots blower and later a small compressor worked at as high pressure as we could furnish and not stall the main compressor. This was found to be about 10 pounds per square inch and the capacity of the Pintsch compressor was increased about 66 per cent. When the Roots blower was belted to the main compressor in a mining plant, the steam consumption was increased only slightly to give a very material increase in capacity."

No. 64.—*Meter for Pintsch Gas and High Pressure Distribution Systems.*—"In many cases it is desirable to install a meter on moderately high pressures, as in natural gas, and recent high pressure distribution systems, and for that purpose an ordinary tin meter inclosed in a cast iron case is often very handy. The pressures inside and outside the case being equalized by a connection into the jacket and the meter, will then operate up to the usual differential pressures without trouble. The cast iron case should have a glass window in front of the meter dial and the readings should be corrected to correspond to the pressure carried."

[To be Continued.

[Continued from page 981.]

## PROCEEDINGS, FIFTEENTH ANNUAL MEETING, MICHIGAN GAS ASSOCIATION, HELD IN BATTLE CREEK, MICH., SEPTEMBER, 1907.

SECOND DAY—AFTERNOON SESSION.

The meeting reconvened at 2:30 P.M., and the President, in introducing Mr. Fred. E. Parke, the holder last year of the Michigan Gas Association Fellowship in the University of Michigan, said: The next paper to be read is from the Michigan Gas Association Fellowship, University of Michigan, and it is the seventh that will have been read before the Michigan Gas Association on such account. It is the joint production of Prof. Alfred H. White and Mr. Fred. E. Parke, and is likely the first of a series to be prepared on similar lines. Mr. Parke is now Assistant Chemist to the Detroit City Gas Company.

Mr. Parke then read the paper, which had for its title

### STUDIES IN THE MANUFACTURE OF COAL GAS.

[For the text of the White-Parke paper, see JOURNAL Oct. 7, 1907, p, 625.]

*Discussion.*

The President—The paper is now open for discussion. Undoubtedly a number here have studied this paper beforehand. Some points in it I believe should be discussed. Necessarily, considerable of it was taken up in explaining the apparatus. Mr. Ball, can you discuss this?

Mr. Ball—I would like very much to have seen that large charge burn an hour or two longer, noting what difference that would make. I think the result would have been much more comparable if the large charge had been burned out more completely than the smaller one. In my experience you can make fully as much gas out of a heavy as out of a light charge, providing you burn it out completely. It seems to me the fact that it was not burned out would explain quite a little of the difference in those two tests.

Mr. Russell—I have enjoyed listening to the paper very much. I do not know that I have anything to add, or criticize. I think the work is just started, and it is only by numbers of tests and continued data that the real value of the work will be brought out. Regarding the viscosity of tar, that the heavier comes down first is determined in general practice, and is probably due to the higher percentage of lampblack and free carbon in the tars that come out first. The Association is to be congratulated on the work you are carrying on. I do not doubt but that in another year it will prove very valuable.

The President—I should like to hear an opinion as to why the making of tar was larger during the smaller tests at higher heats than in the larger tests at possibly lower heats. To me that seems not in accord with ordinary practice.

Mr. Douglas—I think Mr. Ball's criticism that the larger charge was not a sufficient length of time to completely burn it out might account for some of it; 270 pounds of coal is too much to burn off in 4 hours with any temperature we have ever carried in that bench.

The President—That does not seem to explain the whole thing, for apparently most of the gas had been driven off, and that even if he had continued the distillation, the amount of tar that would have been recovered from the lean gas at the end would not account for the apparent discrepancy. Were temperatures taken at any time during the test?

Prof. White—Just at the end of the test; the temperatures were only about 10° apart.

The President—How were the temperatures of the retorts, starting the tests?

Prof. White—Unfortunately that was not taken. We were so busy in getting ready to start up at the time the charge went in that we did not get the temperatures.

The President—Which of the tests ran first, or were they run on different days?

Prof. White—Entirely different days; 70 pounds was the first one. 350 was run subsequently.

The President—How was the pressure in the retort governed?

Prof. White—That was governed by the men whose duty it was to keep it steady. There was a gauge on the inlet of the P. & A., but we have not got any automatic pressure regulator on the exhauster. It was one man's business to keep the suction constant at about $\frac{1}{4}$ inches at the P. & A. Another man was on top of the bench all the time, whose duty it was to take temperatures, and if the suction varied at all over $\frac{1}{10}$ of an inch, plus or minus, he was to send down word to look out for it.

The President—What pressure was on the retort itself?

Prof. White—We aimed to keep about $\frac{1}{16}$ of an inch suction on the top of the standpipe. I did not have a gauge lower down.

The President—You must have had a pretty tight retort. Anything to offer on this, Mr. Lloyd?

Mr. Lloyd—Mr. Chairman, you rather stole my thunder. I was going to ask a question to bring out the matter of the production of the tar. I refer to the test No. 5; production of tar, 11.60; and to No. 6, 15.6 gallons. Practically all that tar in test No. 6 appeared to come off with the first 1½ hours. You will note the rate of production of that tar was nearly double what it was with the heavy charge during the same period; and, except in the third hour, it continuously was above the production that we find with the heavy charge. Now, at the same time apparently the production of naphthaline and ammonia was heavier with the light charge. The production of naphthaline falls low on the heavy charge, the same as the production of tar, probably because the heat did not get into the interior of that heavy charge; but the question is, where the tar went to with the heavy charge. I conversed with Prof. White on that point last night, and would rather he gave the explanation, than for me to repeat his. If he will bring out those points, the relative production in light and heavy charge, he can do it better than I can.

The President—What was the temperature of the retort at the end of the charge?

Prof. White—It is about 1,800°, pretty nearly 1,900°. It was hot, very hot.

The President—In other words, you would not get up to a point at any time where the temperature was sufficient to disassociate the ammonia?

Prof. White—Oh, yes; away above it.

The President—About 1,000° C.?

Prof. White—It depends not only upon temperature but upon the amount of contact between the ammonia and some solid surface. Experiments made in our own laboratory and elsewhere have shown that ammonia can be passed through smooth glass tubes at a temperature of about 800° and suffer a disassociation of only about 5 per cent. If that same tube should be filled with a foreign substance like pumice stone, the ammonia, by passing through at the same rate and temperature, the disassociation will advance to 90 per cent. But in the case of our heavy charge the retort was practically filled with coke, so the gas would have to strike in the passage over that coke, and filter through it, and our ammonia would have disassociated largely the tar constituents of our gas, and by disassociation, the forming of carbon on top of the coke, and the hydrocarbon gas would be disassociated the same way, which I think that must be the reason for the striking differences alluded to. In No. 6 quite a volume of pure ammonia gas passes through a channel along the top of the retort, and quickly goes out; and in No. 6 through filtering through hot coke, a greater break down, the result being you get less liquid products and more coke. I think the point is perfectly well taken.

The President—That must be the explanation. Any discussion as to the work of the condenser. Do you wish to discuss it at all, Mr. Blauvelt?

Mr. Blauvelt—I do not think I can add any light to the discussion. One thing brought out does not exactly agree with the experience which I have had. We find that large charges in coke ovens tend to produce higher yields of ammonia and less naphthaline than small charges; but the gas passing out on the top of a heavily charged oven is above the highly heated zone, which is a very different condition from that found in ordinary gas retort.

The President—If there is nothing further, I should like to have Prof. White or Mr. Parke, if he so desires, take up any points to further illuminate us, and close the discussion. Anything more you want to say Prof. White?

Prof. White—I think not.

Mr. Douglas—Before this discussion closes, I wish to say I hope the members of the Association will appreciate the disadvantages under which the work was done this year. As stated in the paper, the plant was not ready for use until the 27th of April, and I think is even now incomplete. I think the condenser has to be changed. Some means have to be found to carry a constant temperature, at any temperature desired in the condensing system; and it takes time to learn your apparatus or to learn what conditions you have to meet in the particular apparatus; but I think we may look for very much better results another year than could be obtained in the short time (only about 1½ months) which they had to work on the apparatus this year.

The President—I want to say for the Association I believe every one appreciates the difficulties. Personally I appreciate them, because in going through this once I carried out very similar experiments, and while we did not attempt to determine so many things—we confined ourselves practically to what was going on in the retort—yet I can appreciate the difficulties they are up against. At the same time I think the experience gained this year will enable them to continue the work with a great deal higher efficiency. Mr. Douglas is Chairman of the Gas Scholarship, and I believe Mr. Traver, Mr. Lynn and Mr. Cross are associated with him. Last year a committee was appointed to look after the Gas Association Fellowship work. They have a report to make, which will be made at this time. Following this report there will be a discussion, that will, in a measure, apply to this paper, but more especially will be on the work for the future. Mr. Douglas will give that report now.

### Report of the Committee of the University of Michigan Gas Scholarship.

At the last meeting of the Association this Committee was appointed with a special purpose in view of erecting the experimental plant for the use of the scholarship work in conjunction with the plant of the Ann Arbor Gas Company. We are glad to say that the mere suggestion of your committee that they desired the assistance and co-operation of the manufacturers of gas apparatus, in the erection of such a plant, brought responses in the shape of promises for all the apparatus necessary for its construction. Although we were somewhat delayed in the completion of the plant, it was finished in time to be of considerable use in the scholarship work.

You have heard a description of this plant in the paper just presented by Prof. White and Mr. Parke, and when we have presented the thanks of the Association to the generous contributors, we feel that our work is complete. We, therefore, desire to extend the thanks of the Association to the following manufacturers for the material and apparatus furnished:

Western Tube Co., for fittings for condenser.
National Tube Co., for 3-inch pipe for condenser.
Lloyd Construction Co., for tar scrubber.
P. H. & F. M. Roots Co., for exhauster.
The Gas Machinery Co., for washbox.
Kerr-Murray Mfg. Co., for purifying box and valves.
Western Gas Construction Co., for station meter.
Sales & Broad Co., of Detroit, for pipe and fittings for connections.

The necessary building for the plant was erected at a cost of $431.38 through the generosity of the following, to whom we also extend our thanks:

Mr. Jules G. Hoffman, General Gas Light Co., J. J. Knight, J. T. Lynn, Hodenpyl, Walbridge & Co., Detroit City Gas Co., Grand Rapids Gas Light Co., Parker-Russell Mining and Manufacturing Co., Irvin Butterworth, W. H. Loutit, B. C. Cobb, W. M. Eaton, B. O. Tippy, W. H. Barthold.

The paper presented by Prof. White and Mr. Parke shows that there is urgent need for a suitable pyrometer for which we hope the Association will be able to provide.

The expenses of the Scholarships have been maintained for the last year by assessments against the various companies of the State in proportion to their output, and we recommend that the same plan be continued. We feel that the work on the present subject is but begun, and hope that another year's work in the experimental plant on the same subject will bring forth valuable results.

The President—You have heard the report of the committee. What will you do with it. I believe this report should have some discussion, and I believe it should take the form of discussing for a little while the future work of the Gas Scholarship. Vice-President Frazer, will you take the Chair? [Mr. Frazer takes the Chair.]

Mr. Dewey—Personally, I want to discuss this because I made mention of it in my address. I have also talked it over with a few of the members of the Association. I believe that we are now in a position to make the Gas Scholarship work of immense value to the gas companies of Michigan. I think if we can furnish them the apparatus, and all the equipment necessary, and the direction that they should have from the practical gas engineers of the State, that we can carry on there economically experiments that the individual plants of the State may not possibly feel able to conduct. I know, at the present time, they are conducting experiments that Detroit has contemplated going into, but which will not be necessary, provided the work is carried along the lines that we would think to the best advantage and to accomplish the results that we hoped to accomplish, Regarding the photometer spoken of in the committee's report, the Detroit City Gas Company stands ready to furnish that photometer free of charge, as I believe Prof. White has already a sight-box and meter, so all that will be necessary is the stand and other

apparatus that will go with a first-class photometer equipment. We have all the patterns for making such a photometer, and while it would cost considerable money to buy it from the American Meter Company, we can furnish it at a very slight expense to ourselves. Regarding the pyrometer, we have a first-class one that they can use. We very seldom use it, and it was purchased for doing this kind of work. I will send that over to Prof. White, and if at any time we should desire to do any experimental work ourselves, we can get it back in a few hours' notice. But, most of all, I should like to see the gas engineers of the State co-operate with Prof. White in this work. I have done nothing this last year, and do not know one who has done anything to assist him in doing his work. There are many things in conducting these experiments that would be of great assistance to him, if he had the direction of a practical man. The Detroit Gas Company stands ready to send over any of its men at any time to assist him in these experiments. If Mr. Cross, or others of our members will do that work, I feel the other gas companies in the State should co-operate to make such a success of this work that we can get direct returns in increased yields of gas tar and ammonia, and greater efficiency of condensers; and, most of all, the ability to use coals which at the present time we cannot use. Many of us have had experience in attempting to use West Virginia coal that ran high in volatile matter, but all have found by such experience they are unable to keep the hydraulic mains clear, and the naphthaline question was a pressing one, yet I feel at the same time the price of these coals is from 20 cents to 25 cents a ton less than the coal we are using to-day. If we can use these coals, we all stand in a position to save approximately 20 cents a ton. That means, as I said in my paper, probably $50,000 a year, of which amount, about $30,000 would be for Detroit alone. You can see the stake that we are playing for. Detroit stands ready to give any and all assistance necessary to solve this problem and to make this work eminently successful. I should like an expression of opinion from different men as to what they think of the practical possibility of continuing this work in a vastly wider field.

The President—That is a very important subject. I hope it will be fully discussed.

Mr. Knight—The suggestion is a very wise one. I think it would pay to put the apparatus in such shape that you could make gas from any kind of coal under all conditions. I understand there have been one or two tests?

Prof. White—Six tests were made.

Mr. Knight—That is a small number. I do not suppose the work done so far has very great value. But I can see, if Mr. Dewey's suggestions are carried out, that a great good can be accomplished. I heartily favor it, and think a committee of engineers should be appointed to lay out a line of work.

Mr. Russell—I agree with all that has been said; speaking from the standp int of one who has been through a year's scholarship work, and who spent 3 or 4 months on the benches, I know what work along that line can be done by practical gas men co-operating with the University people. A practical gas man very often is able to point out just where a trouble is over which time should not be wasted. I think the suggestion a very wise one. I am not close enough to run out to Ann Arbor myself, to help the thing along.

Mr. Douglas—The co-operation of gas engineers is the most valuable thing that can be done towards going on with the work. Other matters, such as obtaining the necessary apparatus and room, etc., can be arranged without any difficulty; but it is the interest and co-operation of men who have had practical experience, that is most valuable and most necessary.

Mr. Traver—It appears to me that on this proposition we are right at the point where we are ready to start in on Mr. Dewey's suggestion. Two years ago we started the study of naphthaline. Since that time preliminary work was engaged in, and it was found that an experimental plant was needed. We provided that experimental plant, and and now are ready to get down to business on the very thing we told them to get down on, the study of naphthaline. Possibly it may be well, after they have studied the naphthaline problem, to solve the worth of this particnlar grade of Youghiogheny coal, which once solved, it may be easy to get after the other. As far as the general subject is concerned (the study of naphthaline and how to take care of it) and cleared away, then will come the time to get after these other coals. The main point is getting the question solved for the particular kind of coal we are all using now. That will open up a much easier way of getting at the coals that will produce more naphthaline and take care of the products from them.

Mr. Lloyd—They say "Great oaks from little acorns grow." It took a long while to start in and get the nucleus of a plant. That plant is good as far as it goes, although of course it is very incomplete as a testing station. While it is probably in good shape from the point of view of educating the students in the University, it is altogether incomplete from the point of view of producing practical experimental results for the gas companies. They require much more apparatus to be able to determine any particular factor or all factors. The co-operation of gas engineers more particularly is necessary to enable the University Faculty to direct its efforts in a thoroughly intelligent and comprehensive manner. This I think we will have increasingly in the future, and that the further apparatus required will be forthcoming.

Mr. Dewey—The general proposition does not necessarily hinge upon the discussion that we are just taking up. I think we already have a committee. As a matter of fact, as I understand it, there is a permanent committee, not simply a temporary one, to look after the gas scholarship work. In other words, the entire affairs of the gas fellowship work were placed in their hands. On that committee are the best engineers in the State, and that committee is free to call upon anyone in the State, and that Prof. White is free to call upon any one. I simply wanted this brought out in discussion, to make it clear to everyone that we have the machinery and the ability, that we can get the apparatus and that we can do what we want. I should like to hear Prof. White on this matter to learn what he thinks about it—it is entirely under his guidance—and as to how he feels in regard to the possibility of such arrangement.

The President—I think we might better let the subject of the committee, etc., remain until to-morrow. We will now listen to the report by Mr. Russell from the

## COMMITTEE ON THE PREVENTION OF ACCIDENTS IN THE MANUFACTURING OF GAS.

Mr. Russell—I wrote part of this on the train while on the way here, and gathered some of the data for it last week when we tried to burn up a plant. If any of you want to get grayheaded, write a paper on accidents to gas industries.

In an address at the Jamestown Exposition, June 10, 1907, President Roosevelt, referring to the subject of accidents, said, in part, as follows: "It is neither just, expedient, nor human, it is revolting to judgment and sentiment alike, that the financial burden of accidents, occurring because of the necessary exigencies of their daily occupation, should be thrust upon those sufferers who are least able to bear it, and that such remedy as is theirs should only be obtained by litigation, which now burdens our courts. As a matter of fact there is no sound, economic reason for distinction between accidents caused by negligence and those which are unavoidable, and the law should be such that the payment of those accidents will become automatic instead of being a matter for a lawsuit. Workmen should receive a certain definite and limited compensation for all accidents in industry, irrespective of negligence. When the employer, the agent of the public, on his own responsibility and for his own profit, in the business of serving the public, starts in motion agencies which create risks for others, he should take all the ordinary and extraordinary risks involved, and though the burden will at the moment be his it will ultimately be assumed, as it ought to be, by the general public."

Such is the view of the President of the United States on this very important question, and is a compact statement of the argument for the Employees Liability Law now before the United States Courts, as presented by the most powerful supporter. Such a law similar to its provisions and extent has been in operation for some time in England and France, and must be the inevitable outcome in the country.

Quoting from a short essay, entitled, "The Perils of Peace," written by President Strong, of the American Institute of Social Service, 57,513 persons died by accidents and violence in 1900, and "In these piping times of peace, we, in the United States kill in 4 years some 80,000 people more than all who fell in battle and died of wounds, on both sides, during the 4 years of our civil war." It is conservatively estimated that 232,000 factory employees are killed or injured annually in the manufacturing industry. All the people in a city larger than Minneapolis killed or injured every year! Including building, mining and railway accidents, it is estimated that more than 525,000 personal accidents happen every year in our industrial army. It is true that many accidents cannot be foreseen, and are inevitable in spite of all possible precautions, but a study of 15,970 accidents in Germany has shown that 53 per cent. were avoidable, and inasmuch as we have more than twice as many accidents among

a given number of employees as Germany it is probable that more than three-quarters of our accidents are avoidable. In other words, it would seem possible, with proper precautions, to save more than 400,000 persons from injury and death every year. Does not the humanitarian side of this question demand consideration?

What of the annual financial loss through accidents? We have heard it said, "It is cheaper to kill men than to protect them." Is it? Again, quoting Mr. Strong: "Taking the average of 5 years, the annual loss by fire for the whole country is $174,000,000, and if Mr. McNeill's statement for Massachusetts holds good for the United States, industrial accidents cost us some $348,000,000 yearly. And three-quarters of the sum could be saved by taking proper precautions."

The general public is rapidly awakening to a serious consideration of this question. Employer liability laws are being talked of and their passage agitated in many States; the newspapers and the magazines have started a rigorous crusade upon the subject, and it is rare indeed to read either a paper or magazine which does not make some comment upon accidents; more attention is being paid to public safety and building laws, and all accidents of a serious nature are being thoroughly investigated by public officials. The States are taking a hand in the matter through their departments of labor, and State Commissioners, as in New York State and Massachusetts, where failure to report personal injury accident is a misdemeanor punishable by fine and upon repetition imprisonment. There was held last winter, at the American Museum of Natural History, in New York city, an Exposition of Safety Devices and Industrial Hygiene, having for its object the interesting of the general public in the matter of safety devices, and the awakening of the public interest to the importance of this question of accidents. This work attempted by this Exposition opens a new field in this country, and is one which deserves the earnest attention and support of every manufacturer. So much for the general aspect of this question. How is the gas man affected? Is he keen to the situation? Will the gas profession lead the procession or trail it? To-day there is probably no other industry as a whole which takes the precaution to guard against accident that the gas industry does. The reasons for this are inherent in the business. The gas man, as a public servant, must at all times be able to supply the public, at their demand and instantly, with his product. Failure to do so spells disaster for his company and many of his customers. An accident to an employee may result in accidents to plant or distribution which will interrupt that service which is the first requisite of the gas business. It is perhaps a thorough comprehension of this first principle, as well as the dangerous nature of the product marketed, that is responsible for the comparatively few serious accidents that occur in the gas industry. Just for the same reason that a weak piece of machinery or a dangerous place is certain to be the most carefully watched, is sure to give the least serious trouble, just because its weakness is known and appreciated. So the gas men, knowing that their business is one demanding constant care and watchfulness, have devoted more time and consideration to this subject of accidents than most industries, hence their excellent showing in what little data there is at hand on this subject. It was with a view toward getting together more reliable data and statistics upon this subject that the following circular letter was sent out to 44 Michigan Gas Companies and 53 outside the State.

The response to this letter was not all that the writer hoped for, owing no doubt partly to the late date of its sending, as well as to the well known, extreme modesty of the gas man, which prompts him to hide his (gas) light under a bushel and look pleasant while he tells you, "Why, we never have any accidents in our business." In a case like this one is always open to the suspicion that those who didn't reply were the ones who should have. Replies were received from 20 Michigan Companies, and 13 outside the State. Classifying the information obtained according to the subject headings in the letter, we find as follows:

Gentlemen: At the last meeting of the Michigan Gas Association a Committee of two was appointed by the President to submit, at the 1907 meeting of this Association, a report upon accidents in the gas industry. It is the aim of the Committee to make this report of value to all gas men, and a basis for future work along the same lines, it being the intention of this report to bring out clearly the very great importance of this subject, to offer a classification of accidents, to show from data the points wherein the gas fraternity are most vulnerable where accidents are concerned, to offer remedies and give precautions that should be taken to prevent accidents of a given nature, to describe various safety appliances now in use in the gas industry, and to discuss ways and means gas companies may adopt to best protect themselves when accidents happen. To accomplish this undertaking, as outlined above, a large amount of data must be collected and systematized, and it is with this end in view that the Committee is asking for your aid and co-operation.

The information and data which the Committee is asking you to help them obtain are contained in the various subject headings as they appear below. If you are unable or do not care to give information upon all subjects, give as little or as much as you see fit; in any event let it be something. All replies and information will be treated purely as statistical, and the names of no companies or persons will appear in the report.

1.—*Financial Loss by Accidents.—First 6 Months*, 1907.—(A) An estimate of the loss your company sustained during the first 6 months of 1907, through damage by fire or explosion to its own property.

(B) An estimate of the loss your company sustained during the first 6 months of 1907, through damage by fire or explosion to property other than company property, but for which company was responsible.

(C) An estimate of the loss your company sustained during the first 6 months of 1907, by accidents to property, machinery, etc., other than that caused by fire or explosion.

(D) An estimate of the loss sustained by your company during first 6 months of 1907, by injury to persons, both employees and others, for which company was responsible.

2.—*Accidents.*—Give a brief account of any of the more unusual, important, typical or common accidents, which have occurred in your company, giving cause, if known, and nature of the accident. (Fires, explosions, personal injury cases, accidents to buildings, machinery, etc.)

3.—*Prevention of Accidents.*—(A) What precautions are you taking to prevent specific accidents, and accidents in general, in your company, such as fires or explosions, injury to persons shutting off gas supply, etc.

(B) Give description and sketch, if possible, of any safety devices you may have in use.

4. *Method of Handling Accidents.*—How do you proceed, when accidents happen, to protect company from damage suits? Have you an adjuster? Do you carry accident insurance? Have you a company physician?

The above questions apply to both the manufacturing and distribution department. A copy of this letter has been sent to the majority of the Michigan Gas Companies, as well as to a few of the larger companies outside of the State.

[Signed] H. Russell, W. H. Barthold, } Accident Committee.

Kindly address all replies to H. Russell, care Rochester Railway and Light Company, Rochester, N. Y.

To the 33 Companies Reporting.

A. Loss sustained during first 6 months of 1907 by damage through fire or explosion to their own property to be $115.

B. Loss sustained to same companies during first 6 months of 1907 by damage through fire or explosion to property other than company property, but for which companies were responsible to be $3,744.

C. Loss sustained first 6 months, 1907, by accidents to property, machinery, etc., other than that caused by fire or explosion to be $700.

D. Loss sustained first 6 months, 1907, by injury to persons for which company was responsible to be $2,868. Two serious cases not settled at time of reply and loss not known.

(2) The accidents reported (classified) were as follows:

| | | | |
|---|---|---|---|
| Injured by machinery | 4 | Gas explosion | 6 |
| Falls | 7 | Elevator | 5 |
| Injured by tools | 4 | Nail in foot | 1 |
| Gas asphyxiation | 5 | Trenches caving in | 3 |
| Burns | 2 | Collapse of floor | 1 |
| Horses | 1 | | |

Number of fatal cases reported was 2.

(3) *Precautions Taken to Prevent Accidents.*—a. Careful instructions to workmen, marine wiring, elevator gates, safety stops and elevator inspection, fire equipment, respirators.

b. *Safety Devices Used.*—None submitted.

(4) Companies having adjuster, 4.

" carrying accident insurance, 20.

" having company physician, 7.

Data and statistics on the subject of accidents are very incomplete, and, concerning the gas industry in this country, there are almost none. It is to be regretted that more companies did not see fit to respond.

The Massachusetts Board of Gas and Electric Light Commissioners, reporting for the year 1906 on personal injury cases, where gas was responsible for the accidents, show 71 fatal cases and 90 serious but not fatal. Of the fatal cases 32 were suicide.

The New York State Commission of Gas and Electricity report for the year 1906, on accidents due to gas or explosion, 9 fatal cases; 33 serious but not fatal, besides minor accidents where number is not specified. Suicide cases are not included in this report. The Bureau of Factory Inspection report 39 persons injured or killed in gas factories for the year 1905. This report covers only the more serious cases and must be very incomplete.

The information gathered from replies of the various companies and the report of the State Commissions, meager and incomplete as it is, shows that a great many people are killed and injured every year in the manufacturing gas industry and that the financial loss from accidents and damage suits is a very considerable item. Questions of humanity, financial loss, public service, and employer's liability legislation render it imperative that the gas fraternity should give this subject the attention its importance demands.

In order to approach the subject of accidents as occurring in the manufacturing gas industry in a logical and systematic manner, and to provide a framework upon which to build, the following classification of accidents has been made.

ACCIDENTS.

I.—Those peculiar to the gas industry.

II.—Those not peculiar but common in the gas industry.

III.—Fires and fire protection.

I.—a. Accidents incidental to manufacture. b. Accidents incidental to distribution. c. By-product industries.

A. *Manufacturing Accidents.*

1. Accidents peculiar to a. Coal gas manufacturing; b. Water gas manufacturing; c. Pintsch gas manufacturing.

2. Accidents common to all gas manufacturing: a. Exhausting, condensing, scrubbing; b. Purifying; c. Metering; d. Storing; e. Governing, compressing, bursting; f. Handling raw materials.

B. *Distribution Accidents.*

1. Accidents in company shops.

2. Accidents on street system—new work, repair work, outside agencies.

3. Accidents on consumers' premises: a. Installation; b. Repairs; c. Defective apparatus; d. Reading meters.

II.—*Accidents Not Peculiar but Common in the Manufacturing Gas Industry.*

1. Machinery—engines, pumps, compressers, tools, belts, shafting, etc.

2. Steam accidents—boilers, steam lines, heating systems, etc.

3. Elevating and storing—elevators, surrays, cars, ladders, scaffolds, etc.

4. Teaming.

5. Faulty design and construction.

III.—*Fires and Fire Protection.*

Taking up in order the various sub-headings of the above outline, we have under accidents peculiar to the gas business and incidental to manufacture:

(a.) Those peculiar to coal gas manufacturing under this heading come, first:

RETORT HOUSE PROBLEMS.

*Ventilation.*—Probably four-fifths of the retort houses in this country are poorly ventilated. Carbon dioxide, poisonous smoke in the eyes and lungs, excessive temperature, all resulting from poorly ventilated retort houses, have made the stoker problem well nigh impossible. The following precautions and suggestions will be found of value: Build the roof high and with a steep pitch. Make the ventilator openings more than large enough, and see to it that there is an opening in the roof directly over the line of the mouthpieces. Gases usually go straight to the roof, and, if their exit is impeded in the slightest degree, will circle back down the side walls. Openings should be provided in the end walls, which can be opened wide in summer and closed during the winter months. Many old retort houses can be made bearable during summer months by removing sections of the roof, cutting holes in end walls or taking them out entirely, if made of boards. The cost of making these openings in the spring and closing them up again in the fall is nominal, and the increased comfort of the stokers, with a decided improvement in results as a consequence will pay for the changes many times over.

In certain sections of this country, where the winters are not severe, it would seem that the retort house building might be dispensed with in part, or even entirely. Sufficient cover and protection could be erected or provided for the workmen and the stack itself placed in the open. Side walls and roofs to a great extent could be dispensed with. This type of construction has its advocates among gas men, even in our regions of northern climate, its supporters pointing to present coke oven practice as an example. Here the ovens are open to the weather and workmen are housed on the machines they operate. This matter will bear investigation and should be carefully considered by every gas man before he puts good money into what is perhaps needless building. Cellars may be ventilated by the use of fans, which pull the steam and gases arising from the quenching through closed fires and discharge them into the outside air. A number of small fans, placed close under the floor and discharging outside, will be found of considerable help, and ventilating shafts opening into cellars, just under the charging floor and carrying up to the roof line. A number of these built into the wall at regular intervals will carry off the steam and gases very rapidly.

Several works have installed a blower system, with piping so arranged that fresh, cool air is blown upon the backs of the men while working in the heat of the retorts. This arrangement has been installed in the Rochester, N. Y., works and has proved very beneficial. One 6-inch opening is provided in front of each bench.

*Retort House Charging Floor.*—The common retort house floor, consisting of steel frames and cast iron floor plates, is dangerous. Steam and hot gases from the cellar below rapidly destroy paint protection, and the beams rust out very rapidly. The writer has seen a new 6-inch I-beam, carefully painted with red lead, so eaten and corroded, in 2 years from the day it was installed in a retort house, that it was necessary to replace it with a new one. Cast iron floor plates are liable to breakage, become loosened and slip from their bearing. The best type of retort house floor is one in which the beams are completely incased by concrete, and the floor itself may be either reinforced concrete or brick tile, or a combination of these. The modern practice seems to be a reinforced concrete floor, with plates adjoining benches, and brick laid along rails where charging and discharging machines are used. A combination concrete and brick floor, having brick for top surface, would seem to offer many advantages.

The framework of the charging floor must be erected absolutely independent of the benches and stack ironwork. Failure to observe this precaution has resulted in extensive and costly repairs and some personal injuries.

*Half-Depth Bench With Pit Construction.*—For small plants, a rear clinkering, half-depth bench, so situated that the ashes, etc., may be wheeled out from the pit bed to the ground, is in many respects ideal. This demands a side hill or extension excavation. Where this construction is not possible it is a question whether the additional economy of a half-depth over a direct fire bench is worth the price. The common half-depth bench, with its dark, hot, foul, back-breaking pit—too low to stand up in and too high to climb out of—is an instrument of torture. Don't build them. Wait and build verticals.

*Some Retort House Accidents and Suggested Remedies.*—1. Men burned while darkening fires, due to hot coke falling in water in each pan. Remedy: Clinker fires without removing grate bars.

2. Man had foot run over by wheel of drawing machine. Remedy: Provide machine wheels with guards.

3. Man injured by fuse of hot carbon flying into his eye from scurfing a retort. Remedy: Place a light metal shield in front of retort being scurfed, also in this connection, to prevent mouthpiece getting red hot, allow small steam jet to play upon inside of mouthpiece.

4. Men injured by being caught between drawing machine and post supporting coal bin. Remedy: Faulty design of house; only possible remedy a change in construction.

5. Men strangled, burned and made sick by hot gases arising from cleaning out standpipes during scurfing of retorts: Remedy: Open standpipe before starting scurfing, also provide men with "smoke muzzle," an apparatus like a football players nose guard, containing a moistened sponge. This is a very good device to use in any smoky, dusty atmosphere. The above are a few of the retort house accidents reported.

*Accidents Peculiar to Water Gas Manufacturing, Building Construction, and Ventilation.*—Where possible the generating house should be isolated, that is, exposed on all four sides. If the air from

the blower system is cool, openings from the blast pipe may be left into the room. These will provide fresh air in the hot weather and also are sure to indicate leaky or open valves. Windows should be removed during summer months. Roofs built high and with large ventilator openings. Condensers and scrubbers should be placed out of doors. In southern climate much of the generator house building may be dispensed with.

*Floors.*—The steel beam floor with iron floor plates has apparently given general satisfaction. Round walks should be provided for the use of the operators where the heat is excessive. Floor should be carefully inspected at regular intervals. The best ground floor is brick.

SOME WATER GAS ACCIDENTS AND PRECAUTIONS TO BE TAKEN.

1.—*Blast Pipe Explosions.*—Cause is almost always due to carelessness on the part of the operator, occasionally to leaky or broken valves. The only way to prevent these explosions is to eliminate the human (?) element. This is best accomplished by the use of a butterfly or hydraulic valve in the blast, prying which opens and closes with the stack valve, while at same time a vent pipe is opened to the air. Hydraulic valves get out of order; the rod and lever mechanism is the more positive. Vent pipes, placed just outside the blast gates, and opening on the operating floor at some convenient point under the eye and nose of the operator, have prevented many accidents. Relief valves, hat plugs, paper flanges, etc., are commonly used, and in some cases seem to have proved effective, while in others they have been of no help. Blast pipes laid in brick or concrete trenches offer the inducement that, in the event of an explosion, the whole may be covered over and used as a blast conduit until a new pipe may be attained. A reserve set of piping and an extra blower should be kept on hand at all times. There is a growing tendency toward providing each set with its own blower, which is either motor or turbine driven. Direct connected outfits of this type running at high speed take up very little floor space and may be placed on the operating floor.

2.—*Washbox Explosions.*—Accidents of this class happen during the cleaning of the washbox and are almost invariably due to a violation of rules or ignorance on the part of the workmen. Washbox *must be* filled to overflowing with water before removing any of cleaning plates on either the standpipe or washbox itself. Valve between box and scrubber must be closed and kept closed during the operation, After cleaning and closing up box, before starting up, fill box again with water and allow gas from system to back up into box as the water runs off.

3.—*Oil Fires.*—A gasket on an oil meter blew out, the oil ignited and operator was burned. Shields placed about the meter will prevent oil from squirting about the room. All oil piping should be *extra* heavy. Oil pumps should never be placed in the generator room, but should be isolated, if possible, and located in a fireproof room. All oil piping should be run as far as possible where a leak or break can do no damage.

4.—*Relief Holder Blowing and Depression in Crown.*—Light the holder so its position can be readily seen. * * * Electric alarms, elevator indicators etc., are all open to the objection that they may get out of order, and, being relied upon, an accident is almost sure to follow. A travelling indicator in the generator room is, however, in some cases indispensable.

5.—*Gas Explosion in Machine.*—One case reported was due to following causes: Machine was being fired up and was under natural draft with the coaling lid closed, the ashpit doors were partly open. Men were working on the down-run valve and had both top and bottom valves partly open. Air filled into the carburetter through down-run valve and formed an explosive mixture with the generator gases. A series of explosions, at intervals of a few seconds, followed until the lower valve was closed.

6.—*Melting the Babbit Out of Blower Journal Boxes.*—There is no remedy other than careful watching. Reserve set of boxes, babbitted and ready for installation, should always be on hand.

7.—*Seal Pots on Fire.*—Usually caused by a splash or match. All seals should be covered with loose metallic cover.

(C.)—*Accidents Peculiar to Pintsch Gas Manufacturing.*—These consist mostly in those caused by the firing of gas oil or hydrocarbon.

*Hydrocarbon.*—This should be stored underground, in well protected metal tanks. The utmost care must be used in handling it at all times.

*Oil Feed for Retorts.*—There have been reported a number of fires in Pintsch plants due to poor oil supply system. The system now in use by the Detroit Gas Company is to be recommended. The oil supply tank is underground outside the retort house, and the oil is forced out of this tank by water displacement.

We now come to those classes of accidents which, while common to all processes of gas manufacture, are still peculiar to the industry. Taking these in the order of the classification:

(a) *Exhausting, Condensing and Scrubbing Gas.*—It has frequently happened that, from one cause or another, exhausters have pulled enough air to cause serious trouble. To detect this there is nothing better than to keep a common jet photometer burning constantly in the foreman's office. There should always be duplicate exhausters. Recording gauges on the inlet and outlet of all exhausters are necessities. All seal overflow pots should be covered with a loose metallic cover. All seals should be made up with ties and plugs so that the overflow may be watched, and should be made up with a shut-off cock. Scrubbers and condensers should be equipped with a permanent iron ladder. Inlet and outlet pipes of all scrubbers and condensers should be piped to a common pressure board. Pressure lines should be run of not less than ¾-inch pipe, drawing toward pipe where pressible (?), and should be provided with small petcocks for testing and draw-off purposes. Any of the standard boards are good; that made by the Gas Machinery Company is both simple and reasonable. Recording gauges located at various critical points are of inestimable value in locating and preventing trouble—no works can afford to be without them. Condensers and scrubbers should be thoroughly steamed out before being opened for cleaning. Electric extension cords for this work should be metal protected, and, as far as possible, their use should be forbidden and mirrors substituted. Respirators should always be used when it becomes necessary to enter a scrubber or condenser.

(b.) *Purifying.*—Probably more serious accidents have occurred in the purifying plant than in any other division of the gas works. The most certain way of preventing purifying house explosions is "Don't build the house." Are we consistent when we store our gas in holders exposed to all the extremes of heat and cold, and at the same time put a roof and 4 walls around our boxes? Water seals can be heated in the winter, and with the modern dry box this necessity is overcome. As protection from the weather for the workmen while changing boxes, a cheap, light roof is all that is necessary. They will work far safer and more comfortably in the open than in a close-walled, poorly-ventilated building. Some English engineers are erecting over their boxes a movable roof, which carries along over the boxes much after the manner of the carriages that raise and lower the covers. Stop building houses, gentlemen, and put this money into something else, where it will not do so much damage. Now, for those who have had the purifying house thrust upon them. Most of the accidents have been due to defective lighting. Marine electric wiring with outside switches is the modern practice. Globes should be vapor-proof, protected by wire guards. Still safer is the lighting by means of outside electric lamps provided with reflectors which throw the light inside. Extension cords should be avoided as far as possible, and where they must be used they should be carefully inspected and lamps provided with wire guard. Safety seals on the inlet lines to purifiers are advisable, but must be carefully inspected and regularly tested. Leaky center-seals and valves often prove very troublesome and are dangerous when boxes are being changed. Such should be repaired at the earliest opportunity and stoppers and vents should be used. Pressure gauge boards should be installed in every house, and the gauge lines carefully and properly run. New oxide, liable to fire, should be removed at once from the building, and a fire hose be kept in readiness where the trouble is anticipated.

D.—*Metering.*—Accidents to be guarded against in this department are cases of asphyxiation. Meters shut down for repairs should be thoroughly steamed out, and should never be entered without the use of a respirator.

E.—*Storing.*—Holder cups should be inspected daily. Rollers and guide wheels oiled and examined at regular periods. Rubber belting over the cups will prevent sudden gusts of wind sweeping the water from the cups and save steam enough in one winter to pay the cost of installation.

*Holder Heating.*—Steam is universally used, although hot water has been suggested. Risers should be open at bottom into tank and each provided with separate shut off valve. Steam nozzles must never dip into cups deep enough to unseal cups in case of back siphoning. Check valves for this work are unreliable. Snow guards for the tank save much heat. Anchor ice is prevented by extending steam pipes in tank two-thirds of way to the bottom.

*Other Precautions.*—Water levels as compared to tank curb should

be used and recorded at regular intervals. Wet snow driven against guide rails will sometimes freeze and cause trouble by blocking the rollers. Holders must be kept well painted.

F.—*Governing and Bursting.*—Every Foulis governor depended upon to supply all, or an appreciable part, of the city pressure, should be equipped with a safety by-pass, automatic in its action. A break in the air line of a Foulis governor will cause it to shut off completely. Fluctuations or "jumping" of a Foulis governor may be stopped by using glycerine in the dashpot. Every city pressure recording gauge should have a U-gauge by its side for purposes of comparison. Holder outlet valves should be locked.

*General Works Precautions.*—All drips should be equipped with a test pipe. A printed form should be filled out each day by the workman pumping drips, giving their condition before and after pumping and amount pumped. "No Smoking" signs, printed in different languages, should be posted conspicuously in all dangerous places. Men should be instructed to pick up all nails and posted warnings of the danger from nails will be found effective. Oil tanks should be carefully vented. Many cities require the placing of oil tanks in brick or concrete pits, and this should always be done.

*Lighting.*—The plant should be thoroughly, extravagantly, lighted inside and out. Light prevents accidents and removes dirt. Electric arcs outside and inside, where there is no danger of explosion from gas leaks, as boiler room, generator room and retort house, with marine electric wiring where safety demands, are the best. A gas works is the worst factory to light satisfactorily with gas that there is. Gas arcs, wall lights and open burners may be used, but in the writer's experience are far from being satisfactory. All inside walls and much machinery should be covered with a coat of whitewash or kalsomine. It will lighten up the darkest hole wonderfully. Small books in pamphlet form, containing rules, suggestions and precautions, such as a book issued by the St. Paul and Rochester Companies to their employees, is a most excellent plan. All companies would do well to copy. A careful daily inspection of the works by the superintendent or his assistant is probably the best means of preventing accidents.

*Distribution Department Accidents.*—By far the larger number of accidents in the gas industry occur in some branch of the distribution department. And of these accidents probably ¾ are directly due to the ignorance and carelessness of the general public, ¼ to negligence and violation of rules on the part of company employees, and the remaining $\frac{1}{12}$ to unavoidable and natural causes. They are largely cases of asphyxiation, explosion from leaks or careless operation of appliances, fires from gas burners, and damage done to property by careless workmen. All are accidents due to the imperfection of the human kind, and will continue to happen just as long as the man who looks for a gas leak with a match, or the woman who gets off the street car backwards, continues to inhabit this sphere. It is true there is a new fool born every minute, but that is no reason why we should not educate them. This class of accidents has been divided for convenience of reference into:

1. Those happening in company shops.
2. " " on street system.
3. " " on consumer's premises.

As the accidents in these three divisions are of a very similar nature, no attempt will be made to discuss each separately but all will be considered as a whole.

Mr. Frank Hellen, Superintendent of Distribution for the Rochester (Minn.) Railway and Light Company, has contributed the following letter upon this subject, which is so replete with good suggestions that it is given in full. It is as follows:

ROCHESTER, MINN., Sept. 6, 1907.

Mr. Herman Russell—Dear Sir: I will go over carefully some of the precautions which we are taking to prevent accidents. We make it a policy when we have an accident to make a thorough investigation as to the exact cause, in order that we may prevent a recurrence of it in the future, and on account of the attention paid to this we have had very few accidents this season. On the attached sheet you will find four orders that were made to enable us to prevent accidents. These orders are given to each employee when he starts to work for us, and each signs a receipt that they receive the same. In the street department. in bagging off gas mains, and using the rubber bag, we have found a great deal of trouble with condensation in the bottom of the old mains, which sometimes causes a new rubber bag to break almost instantly. To overcome this we tried a stopper which worked well in new pipe but not in old. Sometimes dirt and condensation lay in the bottom of the pipe so that it would allow gas to escape under the stopper, hence we are using in all cases a bag and stopper, with the result that we have had no accidents from asphyxiation on main work this year. We have also been quite fortunate in not having any of our men overcome by gas while tapping gas mains. In the past year we supplied each foreman with a respirator which is used on all 1¼-inch taps and over. This is also used in the placing of gas bag or stopper in all 8-inch mains and over. The respirator is also used when a leak of any kind is being repaired. I have seen accidents occur when men were asphyxiated with gas while running a service, especially while engaged in running a service under a close building. During the past year we have made what we call a stopper, which is nothing more than a rubber cork. It has a handle which passes through said cork, fastens with two lock nuts, and is placed in the service "T" before it is screwed into the gas main. The service is then laid and tested with soap suds, and the result is that no gas escapes into the house or around the men while working, and we have no accidents whatever. I have known cases where houses have caught fire while men were engaged in doing this work, and in one instance where house was blown to pieces. This is entirely overcome by the above. We have always had more or less trouble through men leaving service trenches open in the streets, running the risk of having pedestrians or horses falling into them, and so for the past year we have left no trenches open at night, unless absolutely necessary. Where the trench is left open it is always on private property, well guarded and protected with lanterns. We have also had trouble with heavy rains, which sometimes cause the trench to sink, through becoming soft. This pertains particularly to streets not paved and poorly provided with sewers. To illustrate, if a trench is filled to-day and it rains hard to-night, this causes the newly filled trench to sink. The morning after the heavy rain each foreman is provided with a bicycle and goes to the various places where trenches have been recently refilled. Should they find some that have caved in, they at once place a guardboard there as well as putting lanterns around to guard and protect it. As soon as possible the trench is refilled with cinders. This season we have had no accidents whatever caused by sunken or soft trenches. Heretofore we experienced a great deal of trouble in leaving wrought iron pipe in streets or public property. Children would throw pipe in the middle of street, and, in many instances, pedestrians would fall over them, causing several accidents. To overcome this we place all pipe on the property of the party where the work is going to be done. All service carts and boxes are left on private property, where possible, and protected by red lights. The reason for placing same on private property is to prevent the children putting out the lights, and also from pulling the cart up and down the street, causing accidents. Each outside service gang is provided with an emergency kit, and all foremen and helpers are drilled once a week in our shop as to just how to use the various utensils, so they can familiarize themselves therewith. This has proven most beneficial to us, for since we began using it we have not been compelled to send one man to the hospital. When it is necessary to close a street, we get permission from the fire department before doing so, thus throw the entire responsibility on them, as well as causing a friendly feeling. In getting air out of new gas main, we tap main where possible with a 2-inch opening. The air is allowed to pass out through this opening until we can place a pipe with Bray burner on same which will burn perfectly. In doing this we leave no air whatever in the pipe, for it may get into a house and so cause an accident. In cutting cast iron pipe, where the gas is on, we used wooden plugs to close opening. Our foremen are provided with wooden plugs of all sizes. We also supply them with muslin tallow, when we have a broken main of any kind. This muslin is wrapped around the pipe in advance of permanent repairs, so as no gas can escape. We also supply all our employees who come in contact with gas in any way, with miner's safety lamps or electric lamps. The use of matches is strictly forbidden, only where they are to be used for lighting burners on gas ranges or lights throughout the house. We use a red flag on the ends of all pipe protruding from our wagons. This represents a danger signal, as well as an advertisement, for on each flag is written the following words, "Get a gas range." We also make it a point to supply each man with a helper, where stove is to be carried through kitchen. This is to prevent scratching the floor or tearing linoleum, etc. All hot water heaters are connected with flues to carry away the product of combustion. Each order of this kind, is stamped, "I watched dial 10 minutes and found (blank) leaks." This is put on order before Inspector goes out on the job. Should gas be escaping in any way, the Inspector would say, "I watched dial 10 minutes

nd found (?) leaks;" and, "Removed meter, or repaired leak, or ound no leak."

We have discontinued the use of stopcocks on gas ranges. This is o prevent accidents caused by lighted burners in oven by turning off stopcock on feed pipe and leaving the oven cocks open. When gas is to be used again, stopcock is turned on, allowing gas to escape into oven which will ignite from top burners, causing explosion. All gas leaks are attended to immediately after we receive complaint, no matter whether large or small, for we cannot determine the nature of the leaks until after our men get on the job. We have monthly meeting of all men in our shop. At this meeting the time is devoted in discussing any question asked by those present. We also go over very carefully any accidents which have occurred since our last meeting, to see if we can find some good, practical way of preventing a recurrence of it in the future. We have discontinued the use of torches, also alcohol lamps for clearing out house risers. This work is now being done by the use of hot water, which is poured on outlet meter connection, heating the gas, and clearing out the riser quickly. In cutting out cast iron pipe with a diamond point, a small canvas is given to the man, to be placed over pipe so that the pieces will strike the canvas and not pedestrians. All nuts on the wagon, and also the harnesses, are examined every day, to see that they are in perfect condition to avoid any accidents which might possibly occur. At the present time there is quite a discussion between the various gas men as to the use of a service cock on the outside near the curb. Personally, I do not favor it unless the service should be 2 inches or over in size, and if they are to be used on services I believe they should be in the nature of a heavy iron gate valve, for if a stopcock is left unused for any length of time, when you wish to use it it is gummed up and turns so hard that it is impossible to use it, so, in case of fire, this stopcock would not be of use. Again, there are many places where a stopcock would be placed where it could not be readily found. I am a believer in putting on service gate valves, supplying buildings where there is an area under the sidewalk. In this case the gate is placed near the outer wall, close to curb, so an extension rod can be run to the bottom of sidewalk; the stopbox being placed therein directly over valve, it thus can be removed very readily, and the gas shut off. I believe in putting a stopcock on all services directly on the inside of cellar walls. These in case of fire can be gotten at as quickly as the outer cock. I don't, however, believe that the outer cock placed on service is any prevention from fires, except on very large services.—Yours very truly, FRANK HELLEN.

The following are special orders of the Rochester Company, similar ones being in use by the Detroit and other companies, which cover many of the precautions to be taken to insure freedom from accidents in the distribution department:

*Special Order, No.* 6.—Subject: Caution to Pipers.—Proper tools are supplied you for boring holes in boards or partitions. Do not use a hot iron for this purpose as it is liable to set fire to the building. Always use *feeling bit* before boring large hole for drops or riser. Select a place in the yard or in the cellar where vise can be put up without injury to fence or building. Tools must not be left where children can handle them or where anyone can trip or fall over them.

*Flooring.*—In sawing out the floor be careful saw does not strike lath and cause ceiling to break. Do not saw flooring straight down by the side of a joist. Saw on a bevel, so when floor is replaced ends of boards will rest on joint. Do not attempt to remove flooring until you are sure the tongues at the sides of the boards are sawed entirely through. Be very careful not to split or sliver the flooring in removing the same from joist. If children are around the house, do not take up much flooring at a time. Put the boards down temporarily as you go along, so they cannot fall or step in the opening. Never leave the flooring replaced where the ends of the boards do not rest on a joist. Never let flooring rest on gas pipe. When leaving job for overnight, be sure that the ends of the boards do not protrude above the level of the floor, in order that occupants may not trip or fall over them.

*Walls and Ceiling.*—Run riser pipe in warm place and be careful not to break plaster when putting pipe in walls. To avoid leaving finger prints on wall or ceiling, place a piece of paper between hands and wall. Never bore holes through ceiling from above you, as you are liable to injure a larger section of plaster than by boring from below. Do not bore a hole through plaster or other material for drops until you have placed a canvas underneath to catch the refuse material. Be careful when boring holes in ceiling where there are ceiling ornaments liable to break or become loosened. Examine same carefully before boring hole. Nail a cleat to joist where necessary to support drops. Never leave ceiling or side drops crooked, loose or resting on the lath.

*Pipe and Fittings.*—Pipe straps or hooks must be used to support pipe where necessary. Never use nails or cord to fasten pipe anywhere. Never tighten caps or drops so that they cannot be easily removed. Use "R. & L." couplings, or lock nut joints, instead of unions, on all concealed piping. Do not use cement to stop leaks in pipe or fittings. The proper distance for a drop to extend beyond the plaster is 1¼ inches to end of thread.

*Carelessness.*—Before entering the house, clean your shoes. Do not attempt to work in an open attic without first placing boards to walk on. Use stepladder where necessary, where work is above reach from floor. Do not stand on a table or chair. Never move furniture with dirty hands nor take hold of a door in any way other than by the knob or handle. Do not hold a light of any kind near the walls or the partitions. Never leave lighted candles in attic or closets, as they may set fire to the house by falling over or burning down. Lighted matches must not be thrown down anywhere. Be sure that the match is extinguished before it leaves your hands. When taking down hanging lamps, be very careful not to spill oil on the floor, furniture or household furnishings. Never carry your dope can through the house. Dope can must be left with vise in the yard or in the cellar.

*Courtesy, Etc.*—So do your work and treat the occupants of the building that they will want to employ *you again* in like capacity. (See General Order No. 4.)—FRANK HELLEN, Supt. Gas Distribution.

*Special Order, No.* 7.—Subject: Pumping Drips.—First, pump all drips dry; that is until the drip pump draws gas; second, the water pumped from each drip must be recorded in gallons on drip report; third, no drip water should be allowed to drip on to the ground from wagon or hose while pumping a drip, nor must any drip water be spilled nor allowed to leak from wagon at any time; fourth, drip stock caps must be replaced so as not to leave leaks, but not so tight that in removing cap the stock will loosen; fifth, the vent cock must be opened when water is being forced into the tank or drawn therefrom, but at all other times must be kept closed. *All* cocks or valves about the tank *must be kept closed* when *not in use;* sixth, that there should be an explosive mixture in the tank at most times is altogether probable for the reason that; (a) no drip can be thoroughly cleaned until the drip pump draws gas; consequently gas is pumped into the tank in greater or less quantities; and (b), that water pumped from a drip is saturated with gas, and, owing to the movement of the wagon and to changes of temperature, more or less will be liberated and form an explosive mixture; seventh, great care should be taken that no open lights are about when emptying the drip wagon; eighth, drip wagons must be taken on to the company's inclosed property before the horse is unhitched. No drip water will be allowed to remain in the wagon over night; ninth, drip wagons must be emptied every day,

SPECIAL ORDER NO. 16.—IMPORTANT INSTRUCTIONS TO INSPECTORS. GAS LEAKS.

*Locating Leaks.*—Never search for a gas leak with match or light. The sense of smell is safer and more reliable for the following reasons:

1. Fire may cause an explosion.
2. Flame may discolor any article it approaches.
3. Odor from flame may prevent later detection of a very small leak by sense of smell.
4. Small leak when lighted burns a blue flame, not easily noticeable, yet may melt a solder joint or ignite other material.
5. Gas mixed with air may form a dangerous explosive, hence fire near a leak in concealed piping or where gas has accumulated is particularly hazardous. Never permit fire or light in any form in an apartment where gas is escaping.

*Note.*—The words flame, fire, match light as used herein, apply to lamps, lanterns or any form of fire or light except incandescent electric light, or miner's safety lamp. When electric light is used do not fracture the glass bulb or break supply wires, as either occurrence would cause a spark sufficient to ignite escaped or escaping gas. When miner's safety lamp is used, do not crack globe, as the crack would admit air and gas and cause an explosion.

A. To determine whether leak exists *beyond meter*, assure yourself that all burners, including pilot lights, supplied by meter are closed.

Turn on gas at meter cock. Watch small test hand on meter dial. If hand moves leak exists. Locate and close leak. Continue this until hand remains absolutely stationary for full *ten minutes*.

B. If you cannot locate or close leak, shut off gas completely at cock or valve directly supplying such leaking pipe or apparatus. Notify occupants of the premises supplied of your action and reason therefor, also at once inform shop foreman * * * give him particulars concerning leak.

C. To locate a leak use first the sense of smell, particularly at pipe joints and fittings. If still doubtful of leak, apply carefully, at each joint and fittings, strong soapsuds and watch for expanding bubbles indicating leak.

*Never Search for Leak with Light.*—Always when repairing or disconnecting any gas pipe or apparatus in service, or beyond meter cock, take the following precautions:

1. Before beginning work, notify occupants of all premises supplied that gas will be temporarily shut off, and that all burners in use, including pilot lights, should be at once closed.

2. Shut off gas completely at cock or valve directly supplying pipe to be disconnected.

3. When work is finished, notify occupants of all premises supplied that gas will be turned on, and assure yourself that all burners are closed.

4. Turn on gas at cock or valve which you closed before beginning work.

*Orders.*—When executing an order for setting meters, turning on meters, reading meters, installing gas appliances, repairing services, complaint orders, and any other orders for the execution of which gas must be shut off, you will, after completion of work and after determining that all burners including pilot lights are closed, watch test hand 10 minutes and continue as in paragraph A.

All meter orders will be stamped, "I watched dial 10 minutes and found .... leaks." This must be filled out in all cases, whether leak exists or not, and the name of the employee executing order must be signed.

*Note.*—Do not leave premises until you are positive there is no gas leak.

Most of the precautions to be taken to prevent accidents in this department consist in careful instructions to workmen and a thorough inspection of all work done. The follow-up system on installations and complaints is to be recommended. Here are a few "don'ts" that it is well to bear in mind in this connection: Don't fail to uniform your men; don't neglect to place a flue connection on all hot water heaters; don't install swing brackets on walls in such a manner that burner may be swung back against wall; don't fail to provide your men with respirators and a U. G. I. emergency gas asphyxiation kit; don't neglect to thoroughly protect all street openings; don't fail to ventilate all governor vaults.

*Accident Common in, but not Peculiar to the Gas Industry.*—Taking these up in the order of the classification:

A.—*Steam Accidents—Boilers.*—The State of Massachusetts has recently passed a law requiring that all boilers installed in the State have the horizontal seams welded and not riveted. (I am told this.) The Detroit Gas Company recently equipped its main boiler valves with stems extending through the wall into another room, so that, n the event of a serious steam break in boiler room, valves can be closed without danger.

2. *Machinery, Engines. Etc.*—Guard rails should be placed around flywheels and moving parts. Gears should be provided with shields. Engines should be provided with automatic governor stops. Automatic positive lubricators, such as Manzel, will prevent many accidents.

3. *Elevating, Storing, Etc.*—There have been many elevator accidents reported by the gas companies. Elevator shafts should be o built and protected, preferably by wire mesh, that there are no projecting parts to catch a man; elevator gates must be installed; car locking devices, that hold the car in position on the platform while the elevator is in motion, are a necessity; elevator inspection should be contracted for, and this inspection should be frequent and thorough. Runways and trestles should be protected by railing, so made that sections can be removed to permit of dumping cars. Ice and snow must be carefully watched and removed at once. They should be well lighted.

4. *Ladders.*—Dispense with their use in every possible way. Build stairs or permanent iron ladders with hand rails to all elevated points that demand constant access.

5.—*Design and Construction.*—Have buildings designed by a thoroughly competent architect and place a competent inspector on the construction.

*Fire and Fire Protection.*—Make all new buildings of absolutely fireproof construction. This means fireproof, inside, on top, underneath and outside. Don't erect four brick walls, then put in a wooden floor, wooden stairs, wooden closets and top it off with a wooden roof, and think you have something that won't burn. Fireproof means steel, with concrete floors, iron stairs, and metal or concrete roof. Walls may be either brick or concrete. Don't use wood anywhere for any purpose. The first cost is slightly higher, but the annual saving in insurance will more than make up this difference, and you can sleep nights when the city fire bell rings.

*Some Fire Precautions.*—Replace wooden floors with concrete, wooden stairs with iron, wooden lockers with metal. Keep oils, grease, etc., in a separate fireproof building. Provide metal cans for waste, greasy rags and rubbish. Put a pail of sand and fire buckets in every room. Have fire extinguishers recharged once a year. Have a separate fireproof building for hose cart and fire apparatus. Have plenty of fire hydrants and fire taps. See that there is ample pressure and sufficient water for fire purposes. Install fire *sprinkler heads.* Ammonia water or a solution of washing soda is a very excellent extinguisher for oil, tar or grease fires. Don't use your fire apparatus for anything except fire.

METHOD OF HANDLING ACCIDENTS AND PROTECTION FROM DAMAGE SUITS.

Most companies carry accident insurance. While this is a protection financially, the fact that some one else will pay the accident bills had a decided tendency to make the companies careless as to accident precautions and accident prevention. There are a number of companies, principally those controlling the railway and electric lighting as well as the gas properties, that have adopted the plan of laying aside each year a certain fixed accident fund. This may be either a certain percentage of the pay roll or a percentage of the gross earnings. This plan would seem to have many advantages, certainly the stimulus then is toward accident prevention. Every company should have on hand in the different departments at all times a complete "first aid to the injured cabinet," and some one or two persons carefully instructed in the use. A doctor's and hospital list should be printed and posted permanently beside the works and distribution department telephones. Some companies pay a physician annual retainers for (and this doctor handles all) their personal injury cases. Many companies have an adjuster who acts for the company in all accident and damage cases. Every company should have someone man who acts in this capacity of an adjuster when accidents occur. It is his duty to get upon the ground and get all the information possible regarding the case. This is very important and will often save the company much future expense and annoyance. To illustrate, I am going to read to you three cases recited to me by Mr. R. D. Murphy, Adjuster for U. R. R. and Light Company.

*Coke Claim.*—Sidewalk Broken.—"Among the many cases that have been brought to my attention for settlement I think the one which I will now relate is, without exception, the best on record. One afternoon while sitting in my office I received a complaint saying that our Company delivered some coke to a house, and the teamster, while driving in, damaged the sidewalk. I at once called at the above mentioned house. When I arrived the lady told me that she had not sent for anyone from our Company and suggested that I call on the landlord, who lived a short distance from the house. I did so and rapped on front door. A lady opened the door, and I asked if Mr. So and So was in, and she replied, 'No.' In the meantime I had noticed the man, with whom I had wished to have the interview, standing in another room, and I said, 'Oh! Hello, Bill; how are you? You are just the man I want to see.' 'Bill' coming out said, in a voice unmistakably Hebrew, 'Who are you?' And I replied, 'I am from the Rochester Railway and Light Co. 'Bill,' said, 'Oh, yes, you're a brudder of mine.' I looked at the man, and asked how it was that I was his brother. 'Why, he said, you belong to the Odd Fellows and so do I, and I am sure you will lay a new sidewalk for me.' I may be an Odd Fellow but the man did not get a new walk."

Another case: Our men were sent out to run a service pipe. In order for the men to do this work they were compelled to go through a front cellar in order to get into the rear cellar. The owner claimed that our men drank 6 bottles of his best wine while doing the work. The wine he said was very old, and he valued it at $5 per bottle. I called at owner's house on a Sunday afternoon, rang front door bell, and a young lady responded to call. I asked if the gentleman was

in, and she replied 'No.' I turned to leave when a man said, 'What do you want?' I said, 'Why, are you the man who made a complaint to the gas company that our men drank your wine.' From his personal appearance I thought he was full of some of this very old wine. I went in and asked him to explain the case to me, and to state the price at which this wine was valued. He said it was very old and it was worth $5 per bottle, or $30 for the lot. I told him I would investigate the complaint very carefully. I saw the foreman of service gang who stated that he had questioned the men and all denied having drunk this wine. After learning these facts I let the case rest for new developments, and a few days later received a letter from an attorney to call and see him in regard to a claim of his. I went to see him and found it was the same old wine case, and that the man wanted $30 in settlement. Before I left the office I found the wine was not so old, and obtained a release in full for $5.

HORSE FELL IN TRENCH.

One rainy Sunday night, about 12 o'clock, sleeping as I thought very soundly, a ting-a-ling-a-ling called me to the phone and the following conversation ensued, "Hello! This you, Mr. Murphy?" "Yes." "Well, now, a horse fell in Company's trench about 3 miles away, and you had better come out right away." I said, "All right, Pat., I will be there." And as misery likes company, I called up "Mr. M.," of Gas S. L. Department, at his residence, got him out of bed, and off we started. We went to street designated. When we arrived we saw two men, and I asked one if he knew where "Bowzer" lived. He said, "I'm the man." The man with him I recognized from his whiskers to be a friend of mine and always on the job in case of an accident. We proceeded to the trench, taking a lantern with us. We jumped into the trench and looked for horse's hoofs, but no imprints of horse's hoofs could be found. We examined soil and found ashes; then went to barn. I picked up horse's hoofs and found no ashes; examined body; also the harness; but could find no ashes. There was nothing broken on the wagon. I said, "'Bowzer,' back that horse out and let us see how he goes." With a lantern as a guide we walked the horse up and down the yard. He was lame in the right shoulder and I led the horse back into the barn. "Now," I said, "I will have the Doctor here in the morning at 7 o'clock, and under no circumstances remove this horse from barn." At 5 A.M. I called our veterinary surgeon, and before 6 A.M. we were on the job. We found the horse in pasture and "Bowzer" asleep. The Doctor and myself proceeded to give him an examination, had sonny run him up and down street, and said, "That will do him; take him back to pasture." I went back to the house and asked if "Bowzer" was still in bed, and was told, yes. "I'll wake him up." I said, "Oh! no, lady; tell B. to call at our office to-day." On the way in our Doctor said that this man, in his judgment, had no cause for action, as he believed the horse never fell into the trench, for the Saturday previous "Bowzer" had brought the same horse to his office. The Doctor said he was lame at that time in the same shoulder, and he had him there on another occasion some months previous. "Bowzer's" horse is still lame in the right shoulder, and the Company has not bought him a new one as yet. The above are of a type that happen every day and show the advantage of being "on the job."

The President here called for

REPORT OF COMMITEEE ON NEXT PLACE OF MEETING.

Mr. Olds, from the committee, said it was their unaminous opinion that Kalamazoo should be selected. The recommendation was accepted and Kalamazoo was unaminously named for the convention place of 1908.

The meeting was then declared adjourned to the following day, at 10 A.M.

[To be Concluded.]

## An Excellent Exhibit at the State Convention of Literary Clubs, Indianapolis, Ind.

[Communicated by MRS. O. N. GULDLIN.[1]]

Dear JOURNAL: At our State Convention of Literary Clubs, held recently at Indianapolis, Ind., the department of Domestic Science gave an exhibition of many of the most modern household utensils. We, of ourselves, could have done little; but our good gas brothers joined in and supplied all our needs, for Mr. Carl H. Graf, of the Indianapolis Gas Company; Mr. F. G. Corbus, Manager of the Sales Department, Welsbach Company, Philadelphia; and Mr. J. F. McNab, of the Welsbach Company at Indianapolis, apparently made this their first consideration. Other manufacturers and merchants caught the spirit of our intent and did all they could to help us out.

The delegates are largely from smaller cities where they do not have a chance to see and know all the good things that are brought upon the market, to help solve our problems, lighten our work and expense, and render scientific living possible; consequently, it meant a great deal to them, to have the gas company, and the Welsbach and electrical companies, send them demonstrators to explain the best uses and appliances of gas and electricity.

With the present high cost of living, and the scarcity of labor, housekeeping done in the old way is more of a problem than most of us are equal to, consequently there is great need for those things that will do away with labor and dirt, and accomplish housekeeping in the same scientific way that you build and operate your gas plants, or in fact conduct any modern business. Personally, I wondered if we would not have done better if we had had one session for the gentlemen, for many of them do not seem to fully realize that the wife cannot, at all times, keep her most charming personality, and feel the corroding care of doing the work in the old way! Perhaps it is quite as necessary for them to see that we need our homes modernized and work with the housekeepers to obtain these results.

Our picture does not show all the things we had. The Light and Heat Company had a very complete lot of electric utensils. The Central Supply Company sent up a Humphrey instantaneous water heater. The Caloric Fireless Cook Stove Company, of Grand Rapids, sent us one of its splendid cookers, and the McDougal Cabinet people helped us in every way. We also had Traveling Domestic Science Libraries from our State library, and much literature on this subject. But the best part of it cannot be put in the picture, the gratitude of the officers and the delegates, and the enthusiasm and appreciation that were expressed by the ladies, as they came again and again to look over our exhibit.

The Welsbach Company hoped to have a splendid illumination for us in the assembly hall, to demonstrate the candle power of their most improved light, but the hotel management would not co-operate with us to that extent; however, in spite of all obstacles, their beautiful lights showed off to great advantage in our exhibition room.

Our Committee certainly hopes that this will be the beginning of just such exhibits at the different State conventions of the Associated Clubs, so that a knowledge of what you are doing for us may penetrate many a home and be the means of lifting much of the drudgery of household life to machinery and result in improved conditions. Our hearts are full of gratitude for the splendid co-operation of the Gas and Welsbach companies.

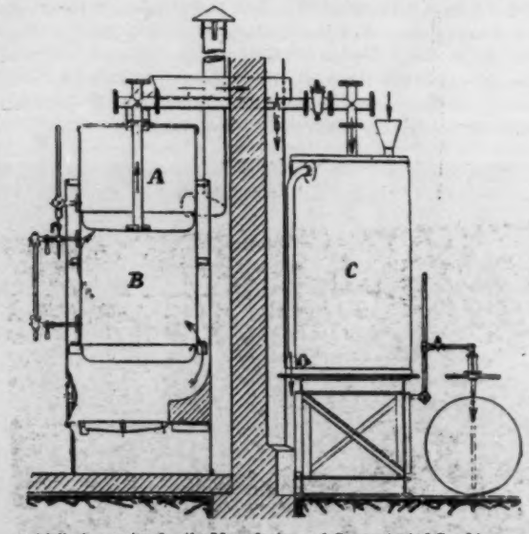
1. Chairman, Home Economics Department, Indiana State Federation of Clubs.

AT the annual meeting of the Capital City Gas Company, of Montpelier, Vt., the officers elected were: Directors, F. Blanchard, G. L. Blanchard, J. Warren Lamb and E. H. Deavitt; President, F. Blanchard; Vice-President, A. C. Blanchard; Treasurer, E. H. Deavitt; Clerk, F. N. Smith; Superintendent, W. C. Bill; Executive Board, F. Blanchard, A. C. Blanchard and G. L. Blanchard.

## Manufacture of Concentrated Gas Liquor.

In a paper read before the Rhenish Westphalian Gas Association, Mr. B. Thiel, of Bremen, on the subject of the manufacture of gas liquor in small gas plants, the *Journal of Gas Lighting* declares that the author noted these things:

Numerous small gas works exist carbonizing so little coal per annum that they cannot profitably work up their own liquor into a salable form, or are situated so far from a manufacturing town that the crude liquor cannot be sent remuneratively as such to an ammonia recovery works. Herr Thiel's idea is to provide such small undertakings with a cheap and simple apparatus, requiring very little labor and no skilled attention, in which liquor can be concentrated to such an extent that it can be sold at a profit instead of being thrown away and perhaps becoming a nuisance. The plant consists of an upright




Thiel's Apparatus for the Manufacture of Concentrated Gas Liquor.

cylindrical vessel, 2 feet 8 inches in diameter, divided into two portions, *A* and *B*, by means of a horizontal partition. The upper and smaller portion *A* is uncovered except for a loose wooden lid to exclude dirt. The partition converts the lower receptacle *B* into a closed still, the pipe for the escape of vapors passing vertically up through the center of *A*. All round *B* is a sheet iron casing, 3 feet 4 inches diameter, which extends half way up *A*, and is fitted beneath the base of the still *B* with a grate for the combustion of solid fuel—*e.g.*, waste coke. A chimney is fixed at the top of the casing to insure the necessary draught. Each section of the cylinder is provided with its own gauge glass and safety valve. The outlet from the still carries a cock, and is then bent downwards to join the coil of a condenser *C*, the condensate being finally received in any barrel or tank. The plant is erected in an odd corner of the retort house, so as to be under the eye of the stoker, with the condenser alongside, or else in the open air, as may be more convenient, and the whole of it occupies only about 16 square feet of ground surface.

When working the apparatus about 90 gallons of crude liquor from the pit are pumped by hand into *B* and heated (without the addition of any lime) for 2 or 3 hours, until the whole of the free ammonia has distilled off. Accompanied by a certain quantity of water, it condenses, collects in the receiver and is ready for sale as impure 10 per cent. aqueous ammonia. The cock on the pipe leading from the still is then shut, when the pressure forces the remaining liquor from *B*, through an appropriate pipe into *A*. While in this open pan the liquid is exposed to the heat rising from the top of *B* and the upper part of the furnace casing, so that its strength (in terms of combined ammonia) gradually increases. Periodically, a further quantity of crude liquor is pumped into the still and the free ammonia is expelled as before. When *A* is full, some of the liquid is run off into any handy receptacle and allowed to cool thoroughly. It is then pumped into the elevated receiver for liquor, whence it flows to the ammonia washer for the gas, where it is used instead of fresh water. In this manner a solution containing combined (but not free) ammonia is constantly employed for washing the gas; the free ammonia it takes up during the process being periodically extracted in the manner outlined. Eventually, the liquid becomes so concentrated as to contain sufficient non-volatile ammonia to bear the cost of carriage to a recovery works.

Herr Thiel claims on behalf of his system that practically the whole of the ammonia obtained from the coal is recovered, partly in the form of strong liquid ammonia and partly in that of a strong ammonium salts. No lime is required. No troublesome waste liquor is left, as the by-product is merely steam. No clean water is required to wash the gas. The plant is only in operation intermittently, therefore a special attendant is not needed. The use of the plant also effects an economy in the size and cost of the tanks holding the gas liquor.

## ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

General Manager Nevins has about convinced the proprietors of the Haverhill (Mass.) Gas Company that it would be a good thing for them to extend the Company's distribution system to and through the adjoining district of Rockland. Mr. Nevins is evidently a firm believer in the value of the nimble sixpence.

The business department of the Milwaukee Gas Light Company is sending out to its customers a handsomely color-printed suggestion that as now is the time to select a Christmas present the hour is at hand to purchase a "Gas Reading Lamp," many styles of which it declares are on exhibition in its showroom.

Mr. J. D. Taylor, Jr., of Terre Haute, Ind., has been appointed Manager of the Wausau (Wis.) Gas Company's office, vice Mr. U. T. Walker, resigned.

It looks that the people back of the project to construct a gas plant at St. Petersburg, Fla., really mean business.

The first result of the merging of the Lockport (N. Y.) Gas and Electric Light Company and the Economy Light, Fuel and Power Company, of Lockport, was the resignation of General Manager Wicks, of the Economy. The merged concern will be under the direction of Mr. O. M. Diall, who has been in charge of the old Lockport Company since 1902.

The semi-annual profit-sharing dividend declaration to its employees by the Grand Rapids (Mich.) Gas Light Company for the last term amounted in value to something in excess of $6,000.

"R. V. W." writing under date of the 29th ult., incloses the following: "After February 1, 1908, the residents of Bay Shore, L. I., are to have a 24-hour service of electric current from the plant of the Suffolk Gas and Electric Light Company. The Company will have expended $35,000 when the arranged for betterments are completed. Under its present contract with the town of Islip the Company is maintaining 161 gas lamps, at $20 per annum each, and 151 incandescent electric lamps at $18 each, the lamps being located in the villages of East Islip, Islip and Bay Shore. A partial moontable is followed. Both plants are under the capable direction of Mr. F. S. North, who was formerly in the service of the United Gas Improvement Company."

Mr. R. H. Doles is up to his best effort in bettering the output at Champaign, Ills, over which gas plant he assumed the works' direction the first ult. He is meeting with good success, not a little of which is due to the active and well-directed co-operation of the Champaign Company's General Manager, Mr. H. J. Piper.

Mr. F. A. Randall has been put in charge of the new business department of the Wichita (Kas.) Gas Company.

At the annual meeting of the Holland City (Mich.) Gas Company the officers elected were: Directors, Irvin Butterworth, John Covode, Dudley Waters, W. E. Raiguel, Joseph Brewer, S. M. Lemon, G. J. Dickma, J. G. Van Pletten and Arthur Van Duren; President, John Covode; First Vice-President, Dudley Waters; Second Vice-President, Arthur Van Duren; Secretary, Joseph Brewer; Treasurer, W. E. Raiguel.

Mr. James Knox Taylor, Supervising Architect, Treasury Department, Washington, D. C., advertises that sealed proposals will be received at the named office, until 3 P.M., 30th inst., for the construction

of an extension, including plumbing, gas piping, heating apparatus, electric currents and wiring to the U. S. Post Office at Lancaster, Pa., in accordance with the drawings and specifications, copies of which may be had in the Treasury office, Washington, or at the office of the "Custodian, Lancaster, Pa."

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THE Bristol Company, of Waterbury, Conn., is again to the fore in the publishing line, having announced that it will shortly issue three new bulletins descriptive of its latest offerings in the line of electrical instruments. Of these, "Bulletin 61" contains a listing of its recording voltmeters, and it has 12 pages, between text and illustrations, describing the voltmeters made by the Company, the excellence of which needs no mentioning at our hands. "Bulletin 62" has to do with the Company's recording ammeters, several new forms of which are being put on the market by the Bristol folks. "Bulletin 63" covers a line of recording watt-meters, and this, besides illustrating the new form of watt-meter, also lists a complete naming of single 2-phase and balanced, 3-phase alternating current instruments, a feature that was missing in the Company's former bulletins. These catalogues will no doubt be appreciated by engineers, when in a doubtful frame of mind as to the best type of design, and will be found helpful in locating the proper instrument for their current wants.

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THE Cedar Rapids (Ia.) Gas Company is engaged in a controversy with the authorities over an extension of its franchise, and naturally into that matter drops the regulation of rates, etc. In connection with the hearings, of course, expert witnesses were retained, and in the number was Mr. George McLean, President of the Key City Gas Company, of Dubuque. That he proved quite up to all the in-and-out requirements of the witness box, stand, or other way of designating it would seem to be well borne out by the following from the Cedar Rapids *Republican* describing his appearance and action: "Polite as a Chesterfield and keen witted as a 'Tom' Reed. President McLean, of the Key City Gas Company, at Dubuque, gave a rare exhibition in Judge Ellison's court in the cross-examination which was conducted by City Attorney Good. A more urbane, thoroughly informed and ready-witted witness has seldom been seen on the witness stand. In the gentle art of giving the opposing attorney a Roland for his Oliver, Mr. McLean is entitled to a Master's degree, and several of those who were in attendance at the trial forgot the case itself because of their interest in the battle of wits between the attorney for the city and the witness for the Gas Company."

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A CORRESPONDENT in Albany, N. Y., forwards us a clipping from a local newspaper which had to do with a "petrified forest recently found in Everett, Mass. To make sure that the story was a true one we forwarded the account to Capt. Wm. E. McKay, Engineer of Construction, Boston Consolidated Gas Company, asking him as to the reliability thereof." His reply was: "It is practically correct." Here is the narrative: "After being buried from the light of day probably for thousands of years, a forest, the great trees of which waved over strange fauna and flora ages before the Anglo-Saxon met the red man on the New England shore, has been unearthed only 23 feet underground in Everett, Mass. Employees of the Boston Consolidated Gas Company were excavating for the new gasholder, on the Everett marshes, when the engineers were surprised to find their test borings had struck some solid substane, but not solid enough for rock. Borings some distance away also encountered the same strange substance, and the workmen were mystified. It seemed to be like nothing more than wood, and yet it was hard to understand how there could be such a stratum down there 28 feet below the surface and 12 feet lower than mean low water level. But all doubts were set at rest when the workmen had penetrated to that depth. First they discovered a great tree with a trunk 4 feet in diameter and still covered with bark. Probably from the dampness it had not petrified, but was still in fairly good condition. Then other trees, some with branches and limbs and some hardly more than logs, were uncovered. There appeared to be a distinct stratum 2 feet thick 28 feet below the surface composed of something very like decayed leaves and twigs. The petrified tree trunks were found scattered around through this stratum just as in a forest fallen trees are found lying on the ground with leaves and small branches blown down by the gales sifted over and around them. Only one theory could account for the strange discovery—that thousands of years ago, where Boston and its suburbs now lie, a great forest covered the land. Some seismic disturbance caused the land to sink, possibly a drop of many feet in a short time; the forest was destroyed and the trees came crashing down. Or perhaps the land sank so rapidly and so far that the waters covered the land where the forest grew, killing the giant oaks. For the dark colored fibre of the petrified trunks is that of red oaks, according to those who have examined these relics of long ago. That the disturbance occurred ages ago is plain from the geological conditions. There are three distinct strata above the sunken forest. First, 12 feet of surface filling—that is, the promiscuous accumulations of civilization. Then the engineers found 12 feet of peat, and immediately over the sunken forest a stratum of dense blue clay 4 feet thick. The attention of Captain McKay, of the Engineering Department of the Boston Consolidated Gas Company, was called to the remarkable strata and he was so interested that he caused photographs to be made of some of the trees and made careful notes of the circumstances so that it might be placed before scientific authorities. Eminent scientists are now investigating the mysterious relics of bygone ages, and some very interesting theories may soon be expected. Already they have called attention to the fact that the entire basin of Massachusetts Bay is slowly but none the less perceptibly sinking. That the lost forest may be taken as a precedent and the prediction made that another sudden drop may occur and the waters of the sea come rushing over the city of Boston is within the realms of scientific possibilities. The strata below the forest are also interesting. The borings have gone down 72 feet and end in a thick stratum of sand. Immediately below the sunken forest clay was found for 6 feet. It was yellow, while that above was blue. A layer of soft clay extended down for 16 feet to the sand, which was bored through for 20 feet without striking bedrock. Where the water gas plant will stand, with a capacity of 10,000,000 cubic feet, the marsh is only 16 feet above the mean low water level; that is, the average level of the sea without the tides. The trees were found 28 feet below the surface, and so were many feet below sea level. Thus a disturbance with sinking of the earth's crust is the only way their presence can be accounted for. In the meantime bits of wood of the trees unearthed from their tomb of ages are eagerly sought as souvenirs."

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THE decision of the Third Division, Appellate Court, State of New York, in the matter of the suit of the Saratoga Springs Gas, Electric Light and Power Company, against a direction of the former Commission of Gas, Water and Electricity, to sell gas and electric currents at named rates, is to go to the Court of Appeals, on this question only: "Has there been any invasion of the defendant's constitutional rights in or by the order appealed from?"

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PROPERTY owned in Richmond, Va., by the Southern Railway Company, but needed by the authorities for the extension of the municipally owned gas works in Richmond has been acquired in condemnation proceedings in the usual way. The Railroad Company made no demur.

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MR. DAVID B. LAW, of Yonkers, has been appointed to a responsible position on the meter testing staff of the Public Utilities Commission, State of New York. The State renumeration on this account is put at $900 per year. Economical, to the last, especially in respect of the "lower jobs," seems the blazoning motto and consistent practice of the Commissioners.

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UNDER the by-law recently passed by the City Council of Windsor, Canada, it is agreed that in 2 years (from Jan. 1, 1908 to Jan. 1, 1910) the gas rate in Windsor shall not exceed $1 per 1,000 cubic feet. This is equivalent to a cut of 5 cents per 1,000 in the years of 1908 and 1909, respectively. The agreement further includes a pledge by the city not to engage in the operation of a lighting plant prior to 1922.

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MR. H. W. DONITHEN, City Solicitor of Marion, O., after a close investigation of the law applying to the subject, has informed the City Council of the named place that it would not be legal to adopt an ordinance directing the gas suppliers from enforcing a rule requiring the deposit of $10 by intending users, or a supply of gas where such users are not owners of "real property," whatever that may mean.

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THE voters of Peabody, Mass., have rejected a proposition to purchase and operate on public account an electric lighting plant.

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THE tests carried out by the City Chemist, of Cleveland, O., respecting the candle power of the gas that is being supplied in Cleveland, show the average thereof to be well above 1 candle in excess of the legal requirements. The legal standard is 17; the actual value is averaging 18.09.

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PROPRIETORS.

THOS. J. CUNNINGHAM,
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NOTIFICATION RESPECTING ADVERTISING.

Orders for new advertising, or for changes in standing advertisements, to insure attention in the issue following their reception, must be in hand any time of Wednesday.

AGENTS:

New York—American News Co., 39 and 41 Chambers St.
*Germany*—Lemcke & Buechner, of New York.
*England*—Aug. Siegle, 30 Lime Street, London.

MONDAY, DECEMBER 9, 1907.

## The Market for Gas Securities.

Whatever change there was in the market last week was for the better. Consolidated managing to get to 95 or thereabouts. Realizing ruled since Tuesday, with the result that a shrinkage of almost 3 points occurred in quotations for it. The opening to-day (Friday) was 92½ to 93, with indications pointing to better figures close at hand. The increase in the Company's output still continues in really surprising manner.

Brooklyn Union is still soft, but its actual financial condition is such that, dividends or no dividends, the shares are worth well over par. The quotations for Peoples, of Chicago, show a substantial gain, but the figure 76 at which it is offered this morning (Friday) is ridiculously low. The general list shows a substantial gain.

## Gas Stocks.

**Quotations by George W. Close, Broker and Dealer in Gas Stocks.**

**16 WALL STREET, NEW YORK CITY.**

DECEMBER 9.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share.

| *N. Y. City Companies.* | *Capital.* | *Par.* | *Bid.* | *Asked.* |
|---|---|---|---|---|
| Consolidated | $73,177,000 | 100 | 92¼ | 93 |
| Central Union Gas Co.— | | | | |
| 1st 5's, due 1972, J. & J. | 3,000,000 | 1,000 | 92 | 97 |
| Equitable Gas Light Co.— | | | | |
| Con. 5's, due 1932, M. & S. | 1,000,000 | 1,000 | .. | 105 |
| Mutual | 3,500,000 | 100 | .. | 170 |
| New Amsterdam Gas Co.— | | | | |
| 1st Con. 5's, due 1948, J. & J. | 11,000,000 | 1,000 | 75 | 90 |
| New York & Richmond Gas Co. (Staten Island) | 1,500,000 | 100 | 37 | 43 |
| 1st Mtg. Gold Bds. 5 p.ct. | 1,000,000 | .. | 98 | 104 |
| Northern Union— | | | | |
| 1st 5's, due 1927, J. & J. | 1,250,000 | 1,000 | 90 | 98 |
| New York and East River— | | | | |
| 1st 5's, due 1944, J. & J. | 3,500,000 | 1,000 | 100 | 105 |
| Con. 5's, due 1945, J. & J. | 1,500,000 | .. | 97 | 101 |
| Standard | 5,000,000 | 100 | 70 | 100 |
| Preferred | 5,000,000 | 100 | 100 | 125 |
| 1st Mtg. 5's, due 1930, M. & N | 1,500,000 | 1,000 | 100 | 105 |
| The Brooklyn Union | 15,000,000 | 1,000 | 84 | 90 |
| 1st Con. 5's, due 1948, M. & N | 15,000,000 | .. | .. | 102 |
| Yonkers | 299,650 | 500 | 130 | .. |
| *Out-of-Town Companies.* | | | | |
| Bay State | 50,000,000 | 50 | ¼ | ⅝ |
| " Income Bonds | 2,000,000 | 1,000 | .. | 75 |
| Binghamton Gas Works | 450,000 | 100 | .. | 65 |
| " 1st Mtg 5's | 500,000 | 1,000 | 95 | 100 |
| Boston United Gas Co.— | | | | |
| 1st Series S. F. Trust | 7,000,000 | 1,000 | 82 | 85 |
| 2d " " " | 3,000,000 | 1,000 | 47½ | 50 |
| Buffalo City Gas Co. | 5,500,000 | 100 | 5 | 8 |
| " " Bonds, 5's | 5,250,000 | 1,000 | 63 | 66 |
| Capital, Sacramento | 500,000 | 50 | .. | 35 |
| Bonds (6's) | 150,000 | 1,000 | .. | .. |
| Chicago Gas Co. Guaranteed Gold Bonds | 7,550,000 | 1,000 | 104 | 106¾ |
| Cincinnati Gas and Electric Co. | 29,500,000 | 100 | 92½ | 93 |
| Columbus (O.) Gas Co., 1st Mortgage Bonds | 1,500,000 | 1,000 | 92 | 96 |
| Columbus (O.) Gas Lt. & Heating Co | 1,683,750 | 100 | 87 | 88 |
| Preferred | 3,026,500 | 100 | 107½ | 103 |
| Consumers, Toronto | 2,000,000 | 50 | 200 | 204 |
| Consolidated, Baltimore | 11,000,000 | 100 | .. | 90 |
| Mortgage, 6's | 3,000,000 | .. | .. | 115 |
| Chesapeake, 1st 6's | 1,000,000 | .. | .. | .. |
| Equitable, 1st 6's | 910,000 | .. | .. | .. |
| Consolidated, 1st 5's | 1,490 000 | .. | .. | 112 |
| Consolidated Gas Co. of N. J. | 1,000,000 | 100 | 15 | 17 |
| Con. Mtg. 5's | 880,000 | 1,000 | 92 | 95 |
| Bonds | 75,000 | .. | .. | 100 |
| Detroit City Gas Co. | 5,000,000 | 50 | .. | 50 |
| " Prior Lien 5's | 4,618,000 | 1,000 | .. | 98 |
| Detroit Gas Co., 5's | 381,000 | 1,000 | 75 | 80 |
| " Inc. 5's | 16,000 | 100 | 98½ | 100 |
| Equitable Gas & Fuel Co., Chicago, Bonds | 2,000,000 | 1,000 | .. | 101 |
| Essex and Hudson Gas Co. | 6,500,000 | .. | 39 | 40 |
| Fort Wayne | 2,000,000 | .. | .. | .. |
| " Bonds | 2,000,000 | .. | 55 | .. |
| Grand Rapids Gas Lt. Co. 1st Mtg. 5's | 1,325,000 | 1,000 | 104½ | 105 |
| Hartford | 750,000 | 25 | 190 | 200 |
| Hudson County Gas Co., of New Jersey | 10,500,000 | .. | 100 | 105 |
| " Bonds, 5's | 10,500,000 | .. | 101 | 102½ |
| Indianapolis | 2,000,000 | .. | 60 | 70 |
| " Bonds, 5's | 2,650,000 | .. | 104½ | 105 |
| Jackson Gas Co | 250,000 | 50 | 52 | .. |
| " 1st Mtg. 5's | 290,000 | 1,000 | 97 | 100 |
| Kansas City Gas Light Co., of Missouri | 5,000,000 | 100 | .. | 36 |
| Bonds, 1st 5's | 3,323,000 | 1,000 | 102 | 104 |
| Laclede, St. Louis | 10,000,000 | 100 | .. | 100 |
| Preferred | 2,500,000 | 100 | 75 | 100 |
| Bonds | 10,000,000 | 1,000 | 104 | 104½ |
| Lafayette Gas Co., Ind. | 1,000,000 | 100 | .. | 60 |
| Bonds | 1,000,000 | 1,000 | 60 | 65 |
| Louisville | 2,570,000 | 50 | 143 | 145 |
| Madison Gas & Elec. Co. | | | | |
| " 1st Mtg. 6's | 350,000 | 1,000 | 106 | 108¾ |
| " 6 per cent. scrip, due 1910 | 100,000 | 25 | 60 | 60½ |
| Massachusetts Gas Companies of Boston | 25,000,000 | 100 | 46¾ | 47¾ |
| Preferred | 25,000,000 | 100 | 78 | 78½ |
| Montreal, Canada | 2,000,000 | 100 | 218 | 218½ |
| Nashville Gas Lt. Co. | 1,000,000 | 100 | 110 | . |
| Newark, N. J., Con. Gas Co. | 6,000,000 | .. | 58 | 58 |
| Bonds, 6's | 6,000,000 | .. | 137 | 138 |
| New Haven | 2,000,000 | 25 | 200 | .. |
| Peoples G. Lt. & Coke Co., Chicago | 25,000,000 | 100 | 76¾ | 77 |
| 1st Mortgage | 20,100,000 | 1,000 | .. | .. |
| 2d " | 2,500,000 | 1,000 | 104 | .. |
| Rochester Gas & Elec. Co. | 2,150,000 | 50 | 88 | .. |
| Preferred | 2,150,000 | 50 | 116 | .. |
| Consolidated 5's | 2,000,000 | .. | 104½ | 105¼ |
| San Francisco, Cal. | 15,800,000 | 00 | .. | .. |
| St. Joseph Gas Co. 1st Mtg. 5's | 751,000 | 1,000 | 92 | .. |
| St. Paul Gas Light Co | 1,500,000 | 100 | 45 | 47 |
| 1st Mortgage 6's | 650,000 | 1,000 | 113 | 116 |
| Extension, 6's | 600,000 | 1,000 | 112½ | 115 |
| General Mortgage, 5's | 2,465,000 | 1,000 | 96¾ | .. |
| Syracuse, N. Y. | 1,975,000 | 100 | 50 | 55 |
| Bonds | 2,047 000 | 1,000 | 102 | . |
| Washington, D. C | 2,600,000 | 20 | 345 | 365 |
| 1st Mortgage 6's | 600,000 | .. | .. | .. |
| Western, Milwaukee | 4,000,000 | .. | .. | .. |
| Wilmington, Del. | 600,000 | 50 | 220 | .. |

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## Position Wanted.

By a young man possessing good references as to character and ability, the management of a gas company's interests and affairs in a town of 10,000 or more. Company just starting and needing services of a careful manager, particularly. Any and all interested address at once, "W. M.,"
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**As Manager of Gas, Electric, or Combined Property.**

Twelve years' successful experience as manager and engineer. Best of reference. Can invest small amount in property. In city of not less than 25,000. Address, "A. D.,"
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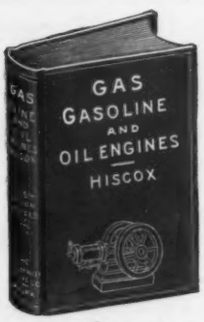


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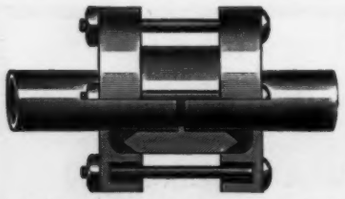

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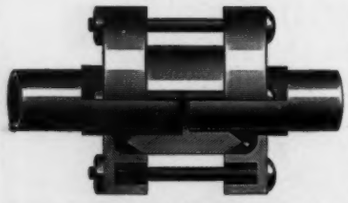

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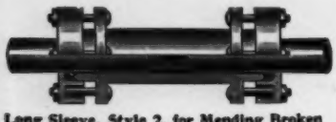

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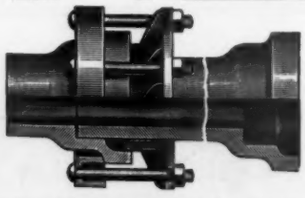

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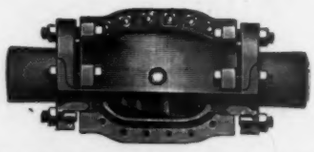

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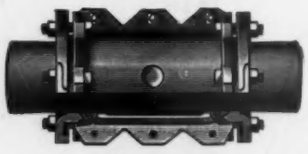

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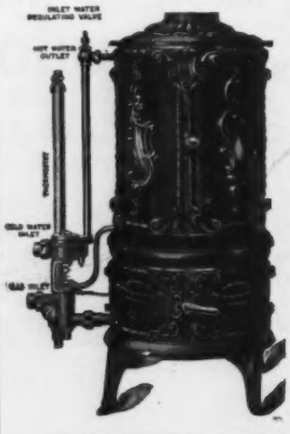


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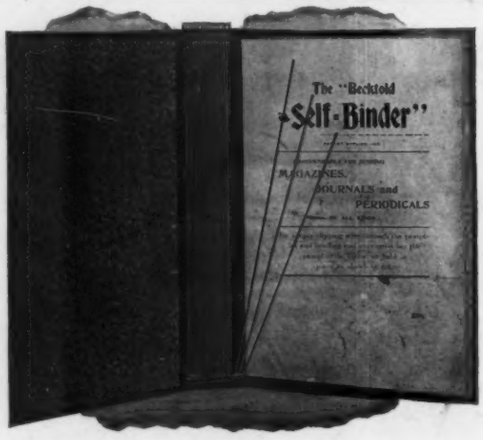


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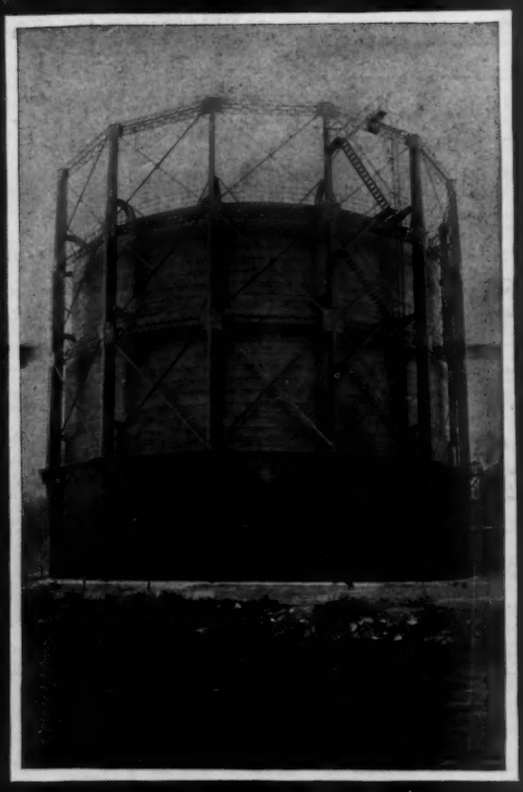

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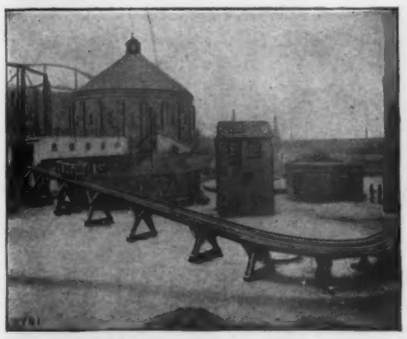

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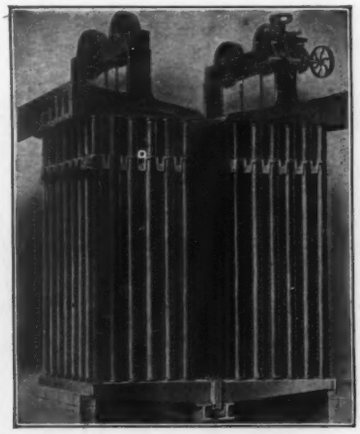

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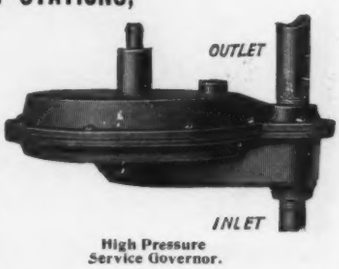


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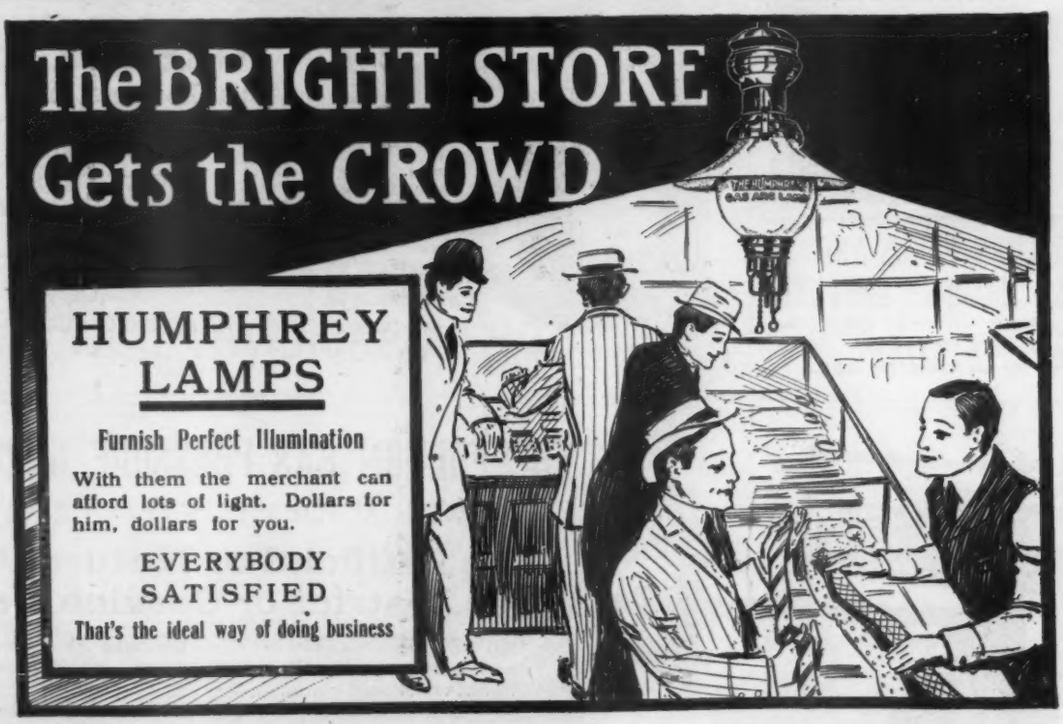


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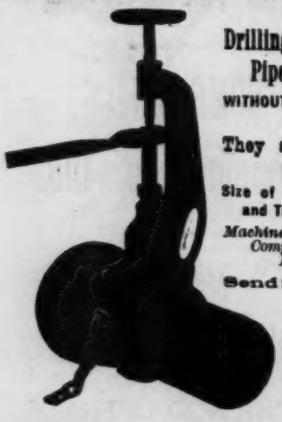

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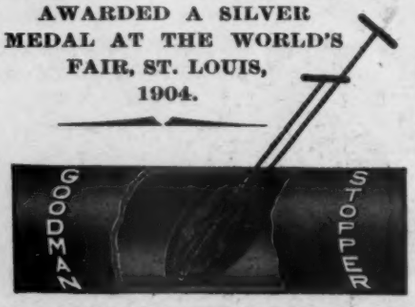


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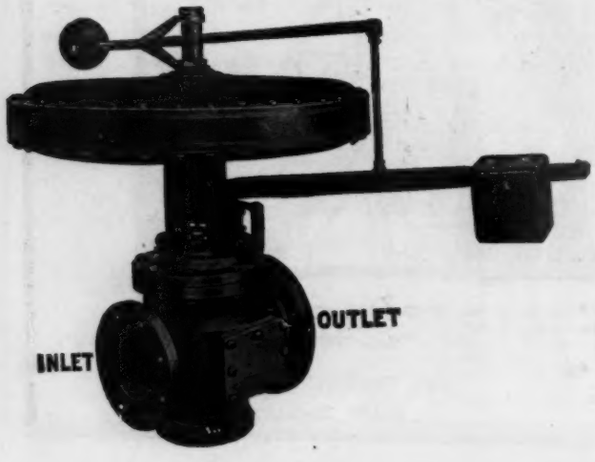


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**NEW YORK, ST. LOUIS, PHILADELPHIA, SAN FRANCISCO, CHICAGO,**

## Photometrical and Experimental Apparatus.


## PUBLIC LIGHTING TABLE.

**DECEMBER, 1907.**

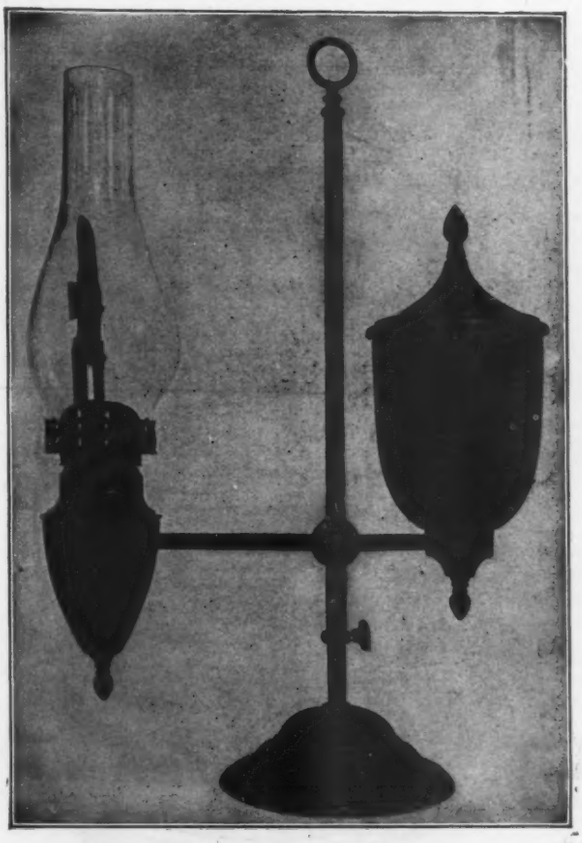
**Table No. 1.**
FOLLOWING THE MOON.

| Day of Week. | Date. | Light. | Extinguish. |
|---|---|---|---|
| Sun. | 1 | 5.00 PM | 6.00 AM |
| Mon. | 2 | 5.00 | 6.00 |
| Tue. | 3 | 5.00 | 6.00 |
| Wed. | 4 | 5.00 NM | 6.00 |
| Thu. | 5 | 5.00 | 6.00 |
| Fri. | 6 | 5.00 | 6.00 |
| Sat. | 7 | 5.00 | 6.00 |
| Sun. | 8 | 5.00 | 6.10 |
| Mon. | 9 | 8.20 | 6.10 |
| Tue. | 10 | 9.30 | 6.10 |
| Wed. | 11 | 10.40 FQ | 6.10 |
| Thu. | 12 | 11.50 | 6.10 |
| Fri. | 13 | 1.00 AM | 6.10 |
| Sat. | 14 | 2.00 | 6.10 |
| Sun. | 15 | 3.00 | 6 20 |
| Mon. | 16 | 4.00 | 6.20 |
| Tue. | 17 | 5.00 | 6.20 |
| Wed. | 18 | No L. | No L. |
| Thu. | 19 | No L FM | No L. |
| Fri. | 20 | No L. | No L. |
| Sat. | 21 | 5.10 PM | 7.20 PM |
| Sun. | 22 | 5.10 | 8.20 |
| Mon. | 23 | 5.10 | 9.10 |
| Tue. | 24 | 5.10 | 10.10 |
| Wed. | 25 | 5.10 | 11.10 |
| Thu. | 26 | 5.10 | 12.10 AM |
| Fri. | 27 | 5.10 LQ | 1.10 |
| Sat. | 28 | 5.10 | 2.10 |
| Sun. | 29 | 5.10 | 3.20 |
| Mon. | 30 | 5.10 | 4.30 |
| Tue. | 31 | 5.10 | 6.20 |

### TOTAL HOURS DURING 1907.

**By Table No. 1.**

| | Hrs.Min. |
|---|---|
| January | 211.10 |
| February | 193.40 |
| March | 182.10 |
| April | 167.00 |
| May | 157.00 |
| June | 145.30 |
| July | 151.50 |
| August | 162.30 |
| September | 175.30 |
| October | 202.40 |
| November | 209.30 |
| December | 231.50 |
| Total, yr. | 2190.20 |



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**2d. It is remarkably steady. Will burn 24 hours continuously with less than 2 per cent. variation.**

**3d. It is much less dangerous than Pentane, which is a kind of gasolene.**

**4th. It is not easily affected by air currents in the photometer room.**

**5th. Since the lamp may burn continuously, the candle power of gas may be taken at any moment, if necessary. This insures steady illuminating power without waste of carburetting material.**

**6th. The first cost of the lamp brings it within the reach of even small gas works.**

**7th. Costs much less to maintain than a Pentane lamp or sperm candles doing the same service.**

**8th. Is not affected by the weather.**

## PUBLIC LIGHTING TABLE.

**DECEMBER, 1907.**

**Table No. 2.**
NEW YORK CITY.
ALL NIGHT LIGHTING.

| Day of Week. | Date. | Light. | Extinguish. |
|---|---|---|---|
| | | P. M. | A.M. |
| Sun. | 1 | 4.20 | 6.10 |
| Mon. | 2 | 4.20 | 6.10 |
| Tue. | 3 | 4 20 | 6.15 |
| Wed. | 4 | 4 20 | 6 15 |
| Thu. | 5 | 4 20 | 6.15 |
| Fri. | 6 | 4.20 | 6.15 |
| Sat. | 7 | 4 20 | 6.15 |
| Sun. | 8 | 4 20 | 6.15 |
| Mon. | 9 | 4.20 | 6.15 |
| Tue. | 10 | 4.20 | 6.20 |
| Wed. | 11 | 4.20 | 6.20 |
| Thu. | 12 | 4 20 | 6.20 |
| Fri. | 13 | 4 20 | 6 20 |
| Sat. | 14 | 4 20 | 6.20 |
| Sun. | 15 | 4.20 | 6.20 |
| Mon. | 16 | 4 20 | 6.20 |
| Tue. | 17 | 4.20 | 6 20 |
| Wed. | 18 | 4.20 | 6.20 |
| Thu. | 19 | 4 20 | 6.20 |
| Fri. | 20 | 4 20 | 6.20 |
| Sat. | 21 | 4 20 | 6.20 |
| Sun. | 22 | 4.20 | 6 20 |
| Mon. | 23 | 4.20 | 6.20 |
| Tue. | 24 | 4.20 | 6.25 |
| Wed. | 25 | 4.20 | 6.25 |
| Thu. | 26 | 4.20 | 6.25 |
| Fri. | 27 | 4 20 | 6.25 |
| Sat. | 28 | 4.20 | 6.25 |
| Sun. | 29 | 4.20 | 6.25 |
| Mon. | 30 | 4.20 | 6.25 |
| Tue. | 31 | 4.20 | 6 25 |

### TOTAL HOURS DURING 1907.

**By Table No. 2.**

| | Hrs.Min. |
|---|---|
| January | 423.20 |
| February | 355.25 |
| March | 355.35 |
| April | 298.50 |
| May | 264.50 |
| June | 234.25 |
| July | 243.45 |
| August | 280.25 |
| September | 321.15 |
| October | 374.30 |
| November | 401.40 |
| December | 433.45 |
| Total. yr. | 3987.45 |

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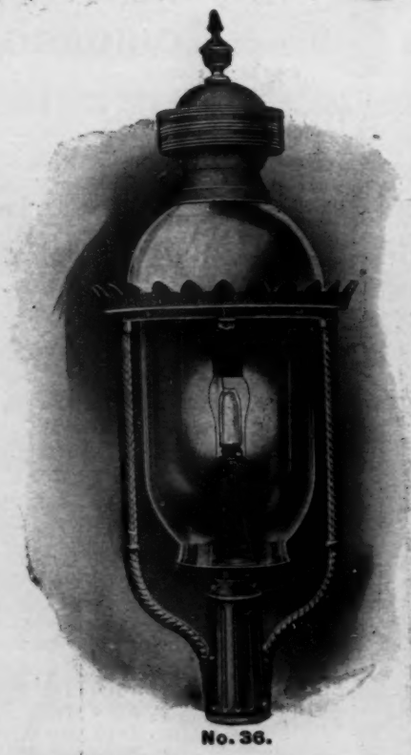
....OF AMERICA....



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**Nashua, N. H.**
**Augusta, Me.** (2d contract).
**Everett, Mass.**
**Jenkintown, Pa.** (2d contract).
**Coney Island, N. Y.**
**Mexico, Mo.**
**Jacksonville, Fla.**
**Syracuse, N. Y.** (2d contract).
**Atlanta, Ga.** (3d contract).
**Holyoke, Mass.**
**Peoria, Ills.**
**Schnectady, N. Y.** (2d contract).
**Danbury, Conn.**
**Galveston, Tex.** (2d contract).
**Quebec, Canada.**
**Indianapolis, Ind.** (2d contract).
**Bessemer, Ala.**
**Waterbury, Conn.** (5th contract).
**Sioux Falls, S. D.** (3d contract).
**Philadelphia, Pa.**

TOTAL SETS INSTALLED TO JULY 1, 1907, . . . . . 34
TOTAL SETS TO DATE, . . . . . 668
TOTAL DAILY CAPACITY, . . . . . 541,655,000 cu. ft.

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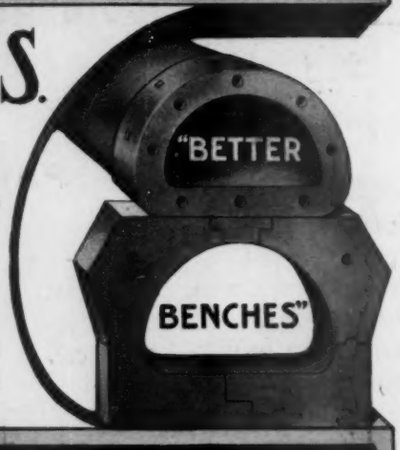


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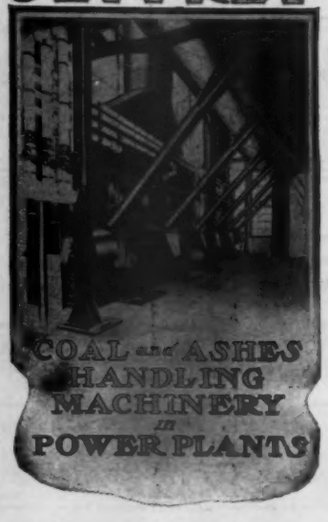


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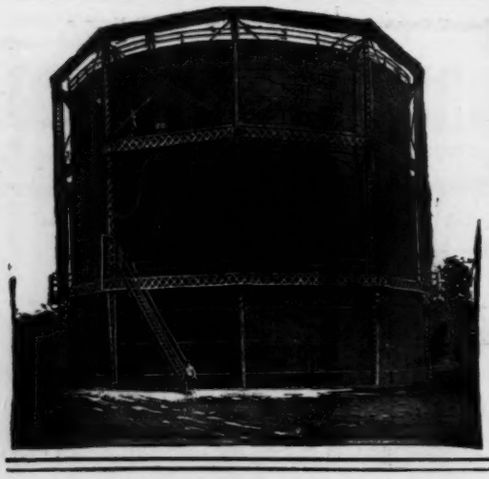

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|---|---|---|---|---|---|---|---|---|
| Diameter of flanges.... | 13 inches | 16 inches | 18 inches | 22½ inches | 27 inches | 31 inches | 31½ inches | 44 inches |
| Face to face of flange... | 12 inches | 12 inches | 12 inches | 14 inches | 17 inches | 20 inches | 21 inches | 23¾ inches |

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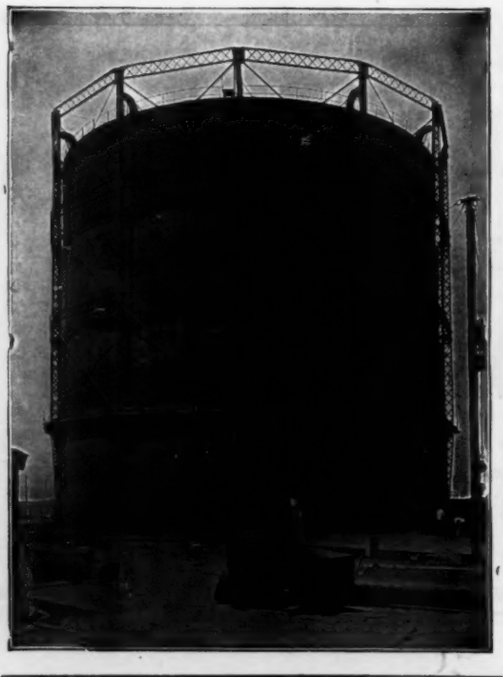

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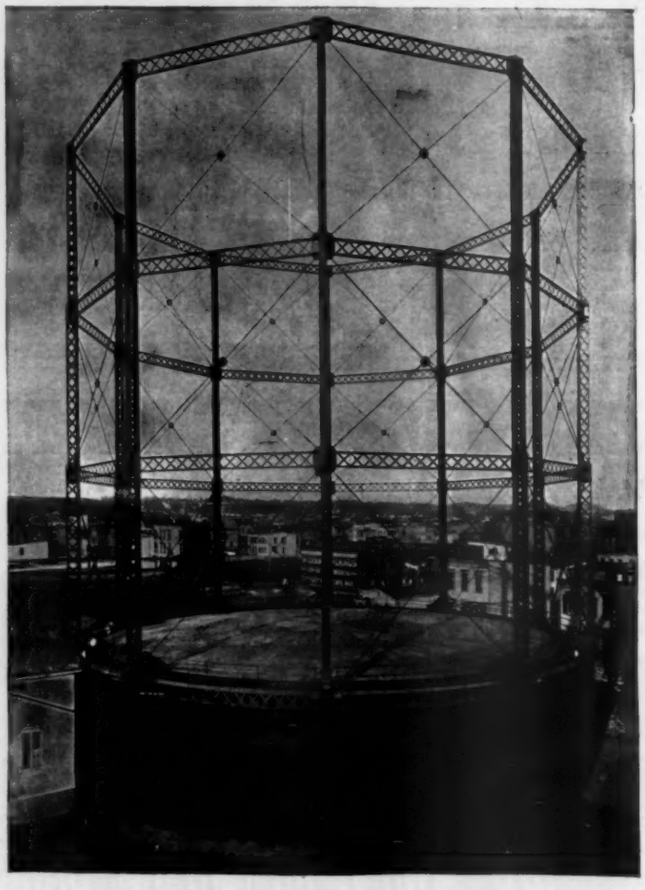

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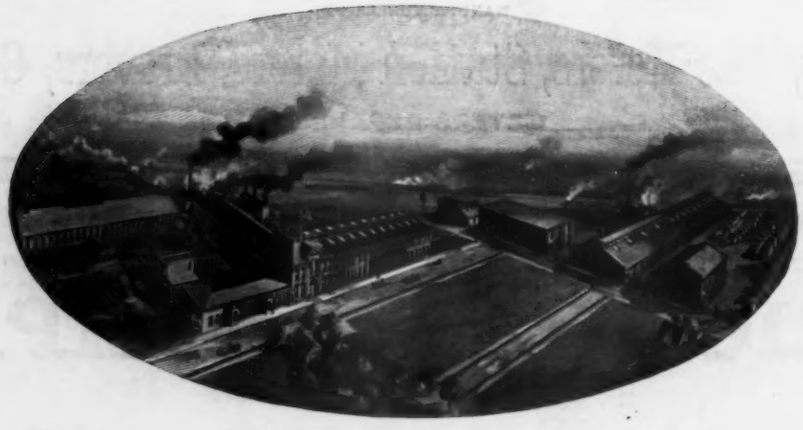

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